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TO OWN THE WORLD

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It is more than a pleasure, an honor really, to be here with you today. To renew old friendships, make new ones, and celebrate shared interests, and maybe more importantly, to celebrate shared experiences along the way.

In 1977, I met a man, with a pipe and a garish bowtie, who was very old—must have been at least 55—who talked about the need for a place—a forum really—where professionals and amateurs and young and old could come together and discuss matters of common interest. He talked about England's Royal Society, New England Botanical Club, Thomas Jefferson, contributions of talented amateurs to the advancement of science; his ring told me that he was a Mason although he didn't talk about that, but he was especially interested in some sort of botanical club that would provide those opportunities for knowing more about the natural world. He was John Wylie, of course, and it was his commitment that made the establishment of the Missouri Native Plant Society possible. I am sure we will hear more about that later.

But John was the real deal. Most of his employees—we were mostly younger and had more college degrees than he—most of us really felt that we were on the spot when we went afield with John. He really liked to name things and to check you out to see what things you knew. He was a forester, but his world didn't end with trees. He was interested in insects and amphibians, rocks, birds, and of course wildflowers. John would have known the old Chinese proverb [isn't there always an old Chinese proverb?] that says, "The beginning of wisdom is to call things by their right names."

This business of knowing the names of things is important. I have thought quite a bit about that recently. In our culture, and probably lots of others, knowing the names of things was a very powerful thing. Just to know or call the name of a thing was to have power over it. I remember having most of a day to kill in Shannon County some years ago and I decided to spend it at Prairie Hollow Gorge. It is a delightful place, a little igneous canyon and

natural area, and I know a lot of you know it well. Anyway, I was walking into the gorge through the back way, and looking at mosses and lichens and blueberries and some of the ephemerals that were out and it struck me that just knowing the names of many of these things that I saw along the way gave me a really special relationship with the plants and the place. And I thought about that power thing, and I saw a small violet there, and thought: "Why not?" so, I called its name: *violet*—nothing—then *birdsfoot violet*—nope—then *Viola pedata*—still nothing. I sort of lost confidence in that power idea, but I felt that I really knew these plants and therefore knew this place by association. And I guess by knowing something about it I felt a sense of ownership or maybe with it, a sense of stewardship with respect to the place. I cared about it.

And I will bet that you can identify with that because just this morning out at the Prairie Garden Trust, I saw people bending intently over a little plant along the trail and saying Latin names above it. It wasn't working for them either.

And you know, just knowing the names of things makes us sometimes feel that we know something about them, and that isn't always true, but it feels good nonetheless. And if I know the name of something, it does give me a special relationship with it. Take for example, *Uniola latiolia*. Sea oats. When we find that in Forest Park in the middle of St Louis, Steve Buback with whom it is my distinct pleasure to teach from time to time, Steve may well say to the class, "This is *Chasmanthium latifolium* and Jim probably knows it by another name, *Uniola latifolia*, and he is right—that is what I would call it.. And that may be an older name, but so what? The recognition of that name and a subsequent relationship were formed on the edge of an Iowa marsh over 40 years ago and it has stood the test of time. I know a little about this plant and where it grows and what it likes and what it looks like and how it turns color in the fall, and together we don't need no stinking four syllable *Chasmanthium* name to make us feel any better about one another. I know sea oats and to some degree by knowing the name, I own it. And because of that, I own the marsh or the roadside or the park where I find it and I have some responsibility for that piece of the world.

Still, we are told that there are twelve or maybe 40 or maybe 400 Eskimo words for snow—and I don't know how many words

for Eskimo—but if you are an aboriginal person living in the far north, then snow is important to you, just like sea oats are important to me, and so maybe two or three names are ok.

One of my favorite quotes from *Sand County Almanac* is when Leopold confesses that while the county clerk's office shows that he owns 120 acres, "But the county clerk is a sleepy fellow who never checks his record books until 9:00 o'clock," and, "At daybreak, I am the sole owner of all the acres I can walk over."

And that is the kind of ownership that I want to talk about. That sense of connecting, knowing, belonging that we get from recognizing plants, animals, rocks, and trees as old friends.

Now the fact is, in today's world, it is a lot harder to develop that sense of ownership than it was at one time. Richard Louv is a journalist who wrote a book a few yars ago called *Last Child in the Woods*, and he tells of having kids looking at bugs or flowers or something relating to nature and the outdoors and a passer by said, "Ah, just killing time, eh?" And that seems to be the way we too often look at spending time in nature. We don't value it—maybe because it is really hard to make much money from just hanging out in the outdoors. And you know—when you are just walking through a prairie (like we did this morning) you aren't really acquiring anything (well, maybe chiggers—that remains to be seen) But even those don't account for much in our society because you can't sell them. Nature just doesn't fit into our economy well, unless of course, you are selling hi-tech hunting and fishing gear.

I sometimes work with kids (and even adults—teachers mostly) who are scared to death of chiggers. They probably have never HAD chiggers, but they have heard of them. Just the whole concept of chiggers is really repulsive to them because they just don't get outside in any natural sense. Now for some of them, they come from a part of town where you and I wouldn't WANT to go outside. There is practically no habitat there. It is dirty, and it is dangerous. I lived for a while a few years ago beside a family of kids whose only contact with nature was with the crows flying by the window twelve stories up.

Jordan was a young man of six who explained very seriously to me that there were bears and wolves in the woods and his parents didn't want him to go in there because they needed him to stay alive. And even one of my college student interns told me that, while they had been thrilled on the trail to see a doe and two fawns,

he had held the kids in his charge back, explaining that it was very dangerous to get between a wild animal mother and her young. Parts of this world are very different from the one I grew up in. Ownership doesn't come easily.

Louv documented some other things for us. He maintains the baby boomers—you know who you are—are the last generation in American to really have an "intimate and familial attachment" to the land and water. Later and future generations see the land in quite a different way than we do-and their notion of spiritual ownership and responsibility is therefore different. Louv cites a San Diego kid: "I would rather play inside—that is where the electrical outlets are."

You probably know that:

— For kids in the last 20 years, the time they spend outside has fallen by 50%.

— Time plugged into electronic media is more that 6 hours per day.

— Adolescent obesity rate has more than tripled.

You may know of course that we all have less leisure time, for some reason. You know that kids spend more time with television and the computer. You know that it is not just kids but all of us that are getting more, uh, substantial. You may not have known that:

— The average kid spends 900 hours/year in school and 1,023 watching TV.

— That the use of ADHD medication by children under 5 (under 5!) has risen 49% from 2001 to 2004. I don't have figures for later.

— For every hour of TV per day a kid watches, the incidence of ADD and ADHD is increased by 10%.

And it isn't just the city kids-kids on the farm fit the same profile; have the same problems. WHY, you might ask—lots of possible reasons:

— Rapid growth of air conditioning after 1950 may have had something to do with it—some research says not.

— We have made outside play criminal in some areas—if you live in the suburbs you may not be able to build that tree house for the kids.

— In today's world, apprehensive parents keep kids close to home.

— School curricula often don't have time for outdoor study.

— Overly structured lifestyles don't allow for wasting time outside—soccer, dance, little league etc.

It is even tougher for boys—we know now that boys need physical movement in order to learn. It is true. Girls can sit at a desk and do just fine. Brain scans show that boys shut down after 20 minutes if they aren't moving. Is it any wonder that:

— Boys get most of the *D*s and *F*s.

— Over 80% of the kids on Ritalin are male.

— Boys are on average one to one and a half years behind girls in reading and writing skills.

That's the problem—What is the answer?

— We know that master/apprentice type relationships really help.

— We know that hands-on learning and field experiences really help.

— We know that non rigid developmental learning works.

— We know that lots of physical movement and unstructured time outdoors really is helpful.

— Lately we have seen research that shows that just being outside really does help; our brains work better–this is major stuff.

What does that mean to us? Well, it is kind of an opportunity. I will bet that you know some kids—maybe neighborhood kids, maybe your kids, maybe grandkids (I don't know what grandparenting is like but next month, Lord willing, I am going to find out. And I am going to try to expose that little girl to prairies and woods and bugs and streams and fishing and camping and all the things that she needs to know before she becomes a teenager and turns on me) and you can do that too.

You can do that for people, young or old, because you know great PLACES that you can share. Place, after all, is also a powerful concept—it isn't just a location or a spot on the map. That's just space. But SPACE becomes PLACE when something special happens there. There is a certain hill on the back side of Forest Lake in Thousand Hill State Park where *Baptisia leucophaea* grows (now it probably isn't *Baptisia leocophaea* anymore because George Yatskievych has probably renamed it, but the plant is still there and it is still *B. leucophaea* to me). The site is a small patch of native prairie grass and wildflowers surrounded by scrubby oak saplings. It is a remarkably beautiful spot—or at

least it was in 1967 when Gary Bell and I took an aging 12 foot Arkansas Traveler fishing boat with a 10 horse Wizard outboard across the lake to search for interesting plants that no one had seen before; and we found the little prairie remnant. It probably never made the natural area inventory list and it may well not even exist today—but in my mind, the wind still moves across the Indian grass and the coneflowers and, yes, the wild indigo on that little hillside. It is a PLACE because we found a new plant for us—something happened there. And I know that you have those places—places that you own because of your experiences there—and places that can become even more special when you share them with others, especially young people.

Yesterday my father, who still lives on the family farm, told me that they had visitors who included a distant relative—a 46 year old unemployed recovering alcoholic. To escape the womanly conversation in the house, dad suggested that they drive around the farm. While they were touring the hills and pasture, creeks and ponds, the visitor said, "You know, I must have been 5 years old when I was here last. I have always remembered it. There was just so much to DO here. I thought it was the greatest place in the world."

That's the kind of impact we can have on people. We have a responsibility to share those experiences—those places. They yield big benefits and we are the ones to do it. After all—we own the world.

MISSOURI'S ORCHID FLORA: THIRTY YEARS OF CHANGE

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I didn't always know that Missouri had wild native orchids growing within its borders. I always envisioned all orchids growing as epiphytes on trunks of trees and their branches throughout the warm tropical climates of the world. Little did I realize that our state had hardy terrestrial orchids until 1975, when I invited Arthur Christ and Father James Sullivan over to my home to help me identify some of the wildflowers pictures I had taken as a photography hobby. They were recommended to me by a staff member of the Missouri Botanical Garden in St. Louis.

After viewing several pictures, Art said, you have an orchid. It was a little insignificant plant without any leaves or green color, just a naked stem, yet it had small whitish flowers with purplish spotted petals terminating a tan colored stem. Art said it was *Corallorhiza wisteriana* Conrad, early spring coral root. It really intrigued me that I had found an orchid on our family farm. A little later, Father Sullivan said, you have another orchid. It was *Spiranthes tuberosa* Raf., little ladies' tresses. This orchid had little white flowers at the tip of a green leafless stem. This small orchid was also growing on our family farm. I had photographed both, because I thought they were strange looking compared to other wildflowers I had been photographing. As it turned out they were different, and the fact really fascinated me that they were orchids.

Art and Father Sullivan said, although the orchids I had photographed were not showy at all, Missouri had some with real showy flowers, just as impressive as the tropical ones. They said they went on regular weekly field trips as members of the Webster Groves Nature Study Society's Botany Group. They said they quite often found some of the more showy-flowered ones on their outings. They even invited me to join them on their fieldtrips if I could get a day off work. At the time, I was working nights and was able to take them up on their offer. In the spring of 1976, I started going on field trips with the botany group. They went to some real rugged places near St. Louis, and elsewhere in the state,

and did show me some showy orchids, such as large whorled pogonia (*Isotria verticillata* (Muhl. exWilld.) Raf.), rose pogonia (*Pogonia ophioglossoides* (L.) Ker Gawl.), and three bird orchid (*Triphora trianthophora* (Sw.) Rydb.). Those really were showy, and I was captivated in learning all I could about orchids. Like all good things, they often come to an end. One day at my work, I was informed that I would be going on the day shift. I was hooked on orchids, but now it looked like I was going to have to find them on my own.

Mr. Christ and Fr. Sullivan told me about the *Flora of Missouri* by Julian A. Steyermark (1963). They said he went all over the state of Missouri recording all of the plants he could find in each county, and the plant specimens that he collected were at the Missouri Botanical Garden in the herbarium. They said I could buy his book there and also look at the orchid collections made by him and other botanists. Each specimen had a label showing where it was collected, the habitat, and the date. If I wanted to, I could get the information from the labels and go find them on my own.

FLORA OF MISSOURI (1963)

I bought Steyermark's (1963) *Flora of Missouri* at the Garden Gate gift shop, and started studying the section on orchids and analyzing all the information I could. I even visited the herbarium looking at all the orchid specimens collected in Missouri. It was quite a job, searching through all the collections. When I found a Missouri collection, I wrote the locality, habitat, date, and collector on a note pad. This was vital information I would use later on in searching for orchids. This was before the Flora of Missouri Project had separated the specimens from those collected in other states and put the Missouri collections into separate folders. In studying the orchid section in the Flora of Missouri, I found that Steyermark recorded 33 different kinds, and that count included both yellow lady slippers. My quest was to find all 33 in flower. On my vacations and three-day holiday week ends, my search took me all over the state exploring habitats where they might grow.

I had heard of a new native plant organization being formed and attended the first meeting on June 2, 1979, at Westminster University in Fulton. I attended this meeting just to see what it was all about. I was overwhelmed by the number of people who

attended who were interested in Missouri's native flora. They came from all over the state representing various federal and state agencies, universities, colleges, different nature organizations, and many individuals interested in native plants. I met many new friends that day with whom I still keep in contact to this today, and, sadly, some have passed on.

One of those new friends was Mervin Wallace. I found out at the time, that his wife's family was from Willow Springs, near my home town, and that he was interested in orchids. He had observed some while wading and fishing the small spring-fed streams near Willow Springs. We hit it off right away and started going out together looking for orchids when we could.

I did find some of the sites from the orchid collections at the Missouri Botanical Garden. One was a Steyermark specimen of *Cypripedium reginae* Walter, showy lady's slipper, on Noblett Creek, not far from where I grew up. I went to the site and found it. Mervin Wallace and John Clinton were with me that day. We had been out looking for orchids elsewhere and not having much luck, then decided to try the old Styermark record. I knocked on the property owner's door, and a lady answered, I told her who we were and that we were searching for orchids. She said her name was Kazie Perkins, and right away she wanted to know how I found out about her orchids. I said I got the information from a herbarium label at the Missouri Botanical Garden in St. Louis, and that a botanist named Julian A. Steyermark collected it there on May 27, 1938. She was amazed, and after talking for awhile, said the orchids were still there, and took us right to the place down on the creek some distance from her house. They were just starting to bloom, and they were just as magnificent and beautiful as any tropical orchid. Steyermark also found *Spiranthes lucida* (H. Eaton) Ames, shining ladies' tresses, at this same site, but we didn't relocate the ladies' tresses. That was thirty years ago, and today, the showy lady's slippers are still there, and Kazie is still a good friend of mine. I used other label information to find orchid sites. While searching for these old record sites, I was finding different orchids not yet recorded for county records, sometimes three or four different ones on a field trip. Wow, I was now finding wild native orchids on my own.

By summer's end of 1979, I was able to find and photograph 22 species of native orchids in flower. Quite a feat in just three

years, as those magical plants hold many mysteries, and don't always flower every year. Eventually, Mervin, John, and I found it more difficult to arrange our schedules to look for orchids.

JOHN E. WYLIE

John E. Wylie was Chief of Natural History with the Missouri Department of Conservation when I first met him. I think the first time I met Mr. Wylie was on a field trip to Pickle Springs in Ste. Genevieve County. At the time Pickle Springs was still privately owned and one had to gain permission to enter the property. It was a field trip set up by Art Christ and Father James Sullivan with Mr. Wylie and Allen Brohn, Assistant Director of the Missouri Department of Conservation to assess the feasibility of acquiring this magnificent area containing rare plants, animals, and fascinating geological features.

Another time I met Mr. Wylie was at the first organizational meeting of the Missouri Native Plant Society in Fulton. I got to visit with him briefly. Mr. Wylie always had a lot of important elements of natural history he was working with and discussing with others, so his time was valuable and spread thin in order to accomplish his important goals in preserving Missouri's natural history. I think, if you look back at Mr. Wylie's 10 year reign as Natural History Chief, he did more to conserve and protect Missouri's natural history elements than any other individual person before or since.

I had the opportunity to meet Mr. Wylie on other occasions during my searches for orchids and other rare plants, or talk with him on the phone. At the end of the growing season in 1979, when I realized I had photographed 22 different orchids, I thought something should be done with the pictures of those rare beauties, so I felt comfortable in approaching Mr. Wylie with some ideas I had, mainly to have an article published in the *Missouri Conservationist* Magazine. One gloomy day, after winter had set in, I called Mr. Wylie, and talked with him about the orchids pictures I had taken. After talking a while, he asked if I could bring my pictures to his office in Jefferson City. I told him I could, and we set up a date to meet. When it was time for me to go meet with Mr. Wylie, I had come down with the flu and had to cancel our meeting. So we set up another time. He asked if I could put my

orchid slides in a carousel ahead of time, and I said I could. This time I was able to go.

At the time the Natural History Section was located in a different building down the road from the main MDC headquarters building, and he gave me directions on how to get there. I found Mr. Wylie's office without any problems. When I entered his office, we sat down and visited, and talked about orchids for a while. Then he got a slide projector, and set it on his desk. We placed the carousel of slides on the projector and showed them on the wall. I then began explaining all the details I knew about each. At the end of my presentation, we sat and talked for a while about orchids, and then I asked, did I have enough good quality pictures and information on orchids to do a feature in the *Conservationist* Magazine?

Mr. Wylie lit up his pipe and sat a while thinking, asking me questions regarding field notes I had made and other details about orchids. After thinking a while longer he said, "Let's do a book." Wow, this statement totally floored me. I informed him that I wasn't a writer, and he replied by saying that I had enough field notes and information, that I would be given guidelines of information to go by, and that they had good editors. I remarked, they surely would have to be good to make sense out of what I wrote. He said it would probably be well over a year before I needed to have it done. I told him I would give it a try. He said good, that he would put it in the upcoming budget. By now it was lunch time, and Mr. Wylie asked if I would join him for lunch at his home. He said that his wife Agnes did pretty well when it came to fixing lunches. When we arrived at his home, he introduced me to Agnes, and said I would be their guest for lunch, then we went out on the patio and visited until Agnes told us lunch was ready. John was right, his wife did fix a pretty good lunch, in fact it was delicious. Before we knew it, it was time to go back to the office and work out the final outline and details about the proposed orchid book. I told Mrs. Wylie good-bye, and thanked her for the wonderful lunch and gracious hospitality. Back at the office, we discussed the final plans, and I bid Mr. Wylie goodbye and left for my home in St. Louis.

While driving back to St. Louis I was floating on cloud nine and elated, but on the other hand, I was apprehensive. Had I

committed myself to something I couldn't do? I couldn't wait until I got home to tell my wife and children the good news.

Right away, I started working on the orchid manuscript. I was working second-shift at the time. When I got home my wife and children would be in bed, so that's when I worked on the project, usually until about three o'clock in the morning. Then, in the daytime, if I needed too, I could go to the Botanical Garden or a nearby field trip for more information. I worked on and completed one species account at a time. I searched my notes for information, went back to the Missouri Botanical Garden for more information from the herbarium orchid collections for the selected species I was working on at the time. I would measure the height, leaf size, and number of leaves, flowers, noted if they were hairy or not, wrote down how many states that species was collected in to get a range summary, noted the locality and date, and collector. I still have most of the notebooks I made at the time.

Mr. Wylie assigned Virginia L. Klomps, a newly hired State Botanist, to work with me on the project as technical editor, and Michael McIntosh as editor. Later on, Mervin Wallace and Virginia were married. Virginia also went by the nickname of Ginny, and that is what I will refer to her by from now on. On occasions Ginny would come to my home in St. Louis or I would go to Jefferson City to work on the manuscript. At the time I had no computer, but did have a good IBM typewriter. But I couldn't type without making a lot of errors that were hard for me to correct, so I wrote the manuscript by hand. Today, I still have the original hand-written manuscript. It's at least one and a half inches thick, maybe more. Ginny did a magnificent and wonderful job in reducing it to a 92 page book. I owe her a big thanks of gratitude. Thank you Ginny!

I had the summer of 1980 to do more field work and research to add to the development of the manuscript. By the end of the growing season I had found and photographed a total of 28 species in flower of the 33 known at the time, an increase of 6 new species more than I had when I first approached Mr. Wylie. The first edition of my orchid book was printed and released in 1981. It amazed me that in six years I had gone from not knowing Missouri had wild native orchids to having a book published.

By the time the third edition of Missouri Orchids was released in 1996, I had found or identified 29 different species growing

within a one-hour drive of my hometown of West Plains. In the beginning, little did I realize that the rugged Ozarks where I grew up,contained the motherlode of Missouri's wild native orchids.

MISSOURI'S ORCHIDS
THIRTY YEARS OF CHANGE

When George Yatshievych asked if I would give a presentation at the Missouri Native Plant Society's 30th Anniversary celebration in Fulton, we discussed the possible subjects, and finely settled on the orchid family. There really have been a lot of new additions and rediscoveries in the last 30 years since the native plant society was first organized. Compared to the large families of the Asteracaeae and Cyperaceae, Orchidaceae probably had had just as large of a percentage change.

Steyermark's (1963) *Flora of Missouri* lists 33 species. Today, there are 37 species. In analyzing the orchid flora, during the last 30 years I find that there has been only one species deleted from the flora. Three species new to science have been added. These three species existed in the state in the past, but were confused with other known species. Three new state records were discovered, species previously known from other nearby states. Two historical species discovered and recorded in the past have not been relocated, and two other historically known species have been rediscovered.

***Corallorhiza trifida* Châtel. var. *verna* (Nutt.) Fernald.**—Plants misidentified as this species were collected by E. J. Palmer in Lawrence County in 1925, and again by M. Tooker in Warren County in 1976. Palmer's collection fooled Steyermark (1963) and was included in the *Flora of Missouri*. When my *Missouri Orchids* was published in 1981, the specimen was on loan from the Missouri Botanical Garden, and not available, so I used the existing record in Steyermark's Flora. By the time the second edition was released, the specimen had been returned and annotated as *Corallorhiza wisteriana* Conrad. It was the albino form of that species and that is what caused the confusion. The Warren County record was also the albino form. This form has since been recorded in Franklin County. So, *C. trifida* was deleted from the orchid flora in our state. This left Missouri with 32 orchid species. If one

removed the yellow lady's slipper varieties from the list and just counted species and not varieties or forms, Missouri's Orchid Flora then numbered 31 species in 1979, when the Missouri Native Plant Society was organized in Fulton. However, by adding the 6 new records, the state now has 37 total orchid species.

THREE SPECIES DESCRIBED AS NEW TO SCIENCE SINCE THE MISSOURI NATIVE PLANT SOCIETY WAS ORGANIZED

***Spiranthes magnicamporum* Sheviak.**—The common name is Great Plains ladies' tresses. The Latin word *magnicamporum* means "of the Great Plains," indicating the region in which it grows. It has long been a part of our orchid flora, but in the past it was confused with *Spiranthes cernua* (L.) Richard, nodding ladies' tresses. The differences between these two ladies' tresses came to the attention of Charles Sheviak while studying *Spiranthes* he found growing in the prairies of Illinois. Through his research, he was able to determine that they were two separate species. He described *S. magnicamporum* as new to science in 1973.

Spiranthes magnicamporum is basically a calcareous-soil species, occurring in prairies with this soil type. However, here in Missouri it is found most often in dolomite glades of the Ozarks, where other prairie species grow. It is an adaptable species as long as it has the calcareous soil conditions. I have observed it on dry loess hill prairies at McCormack Conservation Area in Holt County, as well as in the soggy fens in Grasshopper Hollow in Reynolds County. At each of these two locations, I originally failed to collect specimens to document the county records. *Spiranthes cernua* is an acid soil-species, occurring mainly in seeps of open woods, seeps in rhyolite, granite, and sandstone glades, and wet to dry acid-soil prairies.

Scheviak's discovery was a red flag to study all Missouri collections and records of the *Spiranthes cernua* complex. Since herbarium specimens are difficult to study in *S. cernua*, a search for living plants was conducted. When *Missouri Orchids* was released in 1981, it was the first written account of this new species occurring in the state. Two counties were documented, and sightings were made in two other counties. Today, there have been

Spiranthes magnicamporum, Great Plains ladies' tresses.

over 25 documented county records. Oddly enough, most of those

records of this prairie species are in the Ozarks. If one studied the range maps showing the dotted counties where the Great Plains ladies' tresses have been documented, one will find it mostly absent from the St. Francois Mountain range, where the acidic soils are derived from rhyolite and granite substrates. It will grow from 6–24 inches tall and blooms from September to late November. Once I found it still in flower in an area protected from frost and cold conditions in a glade in Taney County the day after Thanksgiving

The Great Plains ladies' tresses have a very sweet fragrance. Once, Wally Weber and I were out botanizing at Busick State Forest and Wildlife Area in Christian County, and we detected a very sweet odor. We were in a cedar glade with wide strips of grassy openings here and there. We wandered into one grassy opening and there they were, dozens of Great Plains ladies' tresses in perfect bloom. That was what we were smelling, some distance away, their sweet fragrance carried to us by the wind.

***Platanthera praeclara* Sheviak & Bowles.**—The Latin epithet, *praeclara*, means very bright, beautiful, or splendid, and refers to the very showy, fringed flowers. The common name, western prairie fringed orchid, originated from the habitat in which it grows, the western portion of the Great Plains. In the past ,it was confused with *P. leucophaea* (Nutt.) A. Gray, white prairie fringed orchid, which is now known to occur only in the eastern portion of the Great Plains. Following the species' separation, *P. leucophaea* now goes by the common name of eastern prairie fringed orchid.

This species, was first described by Charles Sheviak and Marlin Bowles in 1986 when they started noticing the difference in the plants growing in the western portion of the Great Plains, compared to ones growing in the eastern portion. Through the differences they observed, they determined that there were actually two separate species of the white fringed orchids growing in the Great Plains region, and the one in the western portion was new to science. Some of the differences they observed were in the flower size, length and thickness of the spur, and the structure of the column. There are other character differences in the fringed petals and sepals, and a different pollinator moth. There are fewer flowers in the raceme, in a more dense form making it very showy. The

overall plant tends to be stouter in appearance and shorter than *P. leucophaea*.

In a study of Missouri's previously collected specimens of *P. praeclara* and *P. leucophaea*, it was found that historically *P. praeclara* occurred in several extant sites in the prairies of western Missouri. Recent field investigation has resulted in three known populations in Atchison, Harrison, and Holt Counties. It has been determined that historically *P. leucophaea* occurred only in eastern Missouri in isolated prairies, prairie marshes, and fens. There have been many searches made by well known botanists, but none of the historical populations now exist (however, see the later account of *P. leucophaea* in this text).

Dr. Leo Galloway found *P. praclara* in Atchison County in 1976. When he found it, there were only two plants, and at the time it was considered to be *P. leucophaea*. Sheviak and Bowles hadn't yet recognized the two separate species. Through Dr. Galloway's kindness in informing me about the site, I was able to gain permission from the landowner, Mr. McKoy and to visit the prairie in which it grew during the time period when it should be flowering. To my disappointment, I could not find a single plant in flower. I informed Don Kurz of my unsuccessful visit and he said he would visit the site on a regular yearly basis, if he could, and keep me informed on the conditions. One day, to my surprise, Don called me, and said that he had been to the McKoy orchid site, and that several were in prime flower. This was 10 years after Dr. Galloway first found it. I managed to arrange my schedule from work to visit the site right away. It was a seven hour drive one way from my home in St. Louis County, but it was worth it to go see the plants and photograph them in flower. One of the pictures I took that day is in the third edition of *Missouri Orchids*. I have been fortunate enough to visit all three sites where it is known to grow today.

***Calopogon oklahomensis* D.H. Goldman.**—This is the latest of the orchid species described as new to science. Like the other two, it has long been a part of our orchid flora. However, in the past it was confused with *C. tuberosa* (L.) Britton, Sterns & Poggenb. That species, also known as grass pink or swamp pink, is a calcareous fen species. *C. oklahomensis*, prairie grass pink, is an upland prairie species. This latest orchid was described by Doug H.

Calopogon oklahomensis, prairie grass pink.

Goldman in 1995 during his graduate research. How strange it is, that all three of the orchids described new to science in the last 30 years are prairie species.

When I was working on the text of the second revised edition of *Missouri Orchids* in 1986, all of the differences I had observed became obvious to me, and that they were probably two separate species. I made comments about the difference I had observed in the ones growing in the upland prairies, versus the ones in the calcareous fens. I had been to the fen sites and the prairie sites where *Calopogon* grows. I got to see them firsthand in flower at both habitats. I thought, how could it be that they are the same

species? The ones I had observed in the prairies bloomed a full 5–6 weeks ahead of the ones in the fens. The flowers opened in rapid succession, plants were shorter, the single leaf was as long as the flowering raceme. All much different than the fen species. I passed this information on to Mr. Goldman for his research.

With the separation of the two species, *C. oklahomensis* is the one found in upland prairies in a few counties of the Osage Plains region of southwestern Missouri, with a disjunct population in a upland prairie in Howell County. The calcareous fen species occurs mostly in southeastern Missouri in the igneous formations of the St. Francois Mountain Range, another strange geological relationship of plant habitats.

THREE NEW STATE RECORD ORCHIDS DISCOVERED SINCE THE MISSOURI NATIVE PLANT SOCIETY WAS ORGANIZED 30 YEARS AGO

***Tipularia discolor* (Pursh) Nutt.**—This orchid was first discovered by Mark Pelton (1989) in Butler County in southeastern Missouri. The Latin word *Tipularia* is from the Latin *tipula,* "water-spider," from the genus of insects to which many craneflies belong. The inflorescence resembles resting craneflies. The epithet *discolor* is in reference to the diffuse color of the flowers. Mark, a forester with the Missouri Department of Conservation in Poplar Bluff, was inventorying Nuttall oaks at the Sand Ponds Natural Area in Ripley County when he came upon a mima mound with a population of cranefly orchids on it. Right away, he thought that this was a new state record. When checking his maps, to his disappointment he learned that he had wandered just a few feet across the state line into Arkansas. He kept a careful watch the rest of the day on the Missouri side, but didn't find any more plants.

Mark and I are good friends, and often went out together taking pictures. He alerted me of his find, and I went to Poplar Bluff the coming weekend. We both searched the Sand Ponds area thoroughly, but to our disappointment came up empty-handed. The following week end I got a very excited call from Mark, with the news that he had found the cranefly orchid at the nearby Corkwood Conservation Area in Butler County. It was growing on wooded mima mounds, similar to the site he had found in Arkansas. The

Tipularia discolor, cranefly orchid; inflorescence (left), leaf (right).

following weekend, I went to see Mark. It was a cold clear day in December, ideal weather for taking pictures. Mark took me to the site, and there they were; dark green leaves that had grown up through a bed of recently fallen oak leaves. There were small colonies of several leaves grouped together. The dark green leaves were veined with a bronze-green on the upper surface, and with dark warty spots. The lower surface was purple in color. The leaf picture on p. 102 of *Missouri Orchids* were taken at this site, whereas the flower picture on p. 101 was taken in Stoddard County.

Cranefly orchids have identical growth habits to the Adam and Eve orchids (*Aplectrum hyemale* (Muhl. ex Willd.) Nutt. Both grow their new foliage in the wintertime, storing up energy in the underground bulbs, utilizing the sun's energy while the trees are bare of leaves. The best time to search for both species is during the winter months. The dark green leaves are easier to see lying on top of the brown leave bed of recently fallen leaves than are the flowering stems in the dappled shaded conditions. The leaves wither by late spring, and at flowering time the plants send up a naked stems with the flowers along the upper portion.

Cranefly orchids have since been found in Stoddard, Oregon, and Shannon Counties. The Stoddard County site has been destroyed by a sand and gravel operation; it was the largest population yet discovered in our state.

***Coeloglossum viride* (L.) Hartm. var. *virescens* (Muhl. ex Willd.) Luer.**—Frog orchid was first discovered by Lisa Hooper in 1997 while searching for ferns on her property in Adair County in northern Missouri. This discovery represents the most southern population in the Midwest. This orchid also occurs in the Rocky Mountains and Appalachian Mountains in the cooler habitats it prefers. At one time when the climate in Missouri was colder, it may have occurred in the Ozarks, much like the relictual *Lycopodium* (club mosses) and *Viola macloskeyi* F.E. Lloyd (smooth white violet), which are both northern taxa with disjunct populations in the Ozarks. Who knows, maybe it will still be found here in a protected cold microhabitat. We just need to search harder in such places. Frog orchid is a circumboreal species, in that it grows around the entire globe, mostly in the colder climate zones of the northern United States, Canada, Europe, northern Asia, and Alaska. It is a forest species favoring very shaded conditions under pine, spruce, and fir. At the Adair County site, it occurs on a wooded slope above a stream, under second-growth oaks and various shrubs. To encounter the plants one has to crawl about under the thick lower branches. Plants were hard to see and photograph in the dappled sunlight that reaches their habitat.

Coeloglossum was at one time placed in the genus *Habenaria* by botanists, and later given its own genus name. Superficially, it can be confused with *Platanthera flava,* (L.) Lindl. var. *herbiola* (R. Br.) Luer because of its similar foliage, flowers, floral bracts, and overall plant size. However, the floral bracts of *Coeloglossum* are much longer. That is how it got its other common name, long-bracted orchid.

The plants found in Europe are var. *viride*, and are generally much smaller in size than those of var. *virescens*. The species names of *viride* and *virescens* refer to the overall greenness of the plants, including the flowers.

***Listera australis* Lindl.**—This small obscure orchid was discovered by Justin Thomas on April 18, 2009, while on a fieldtrip with the Missouri Native Plant Society at the Holly Ridge Natural Area in Stoddard County. A single flowering plant was found in a spring branch fairly close to a well known population of *Isotria verticillata*. Over the years, many well known botanisst

searched this area, but this rare beauty went undetected until sharp-eyed Justin discovered it.

This same weekend, Peggie Skinner and I were at nearby Charleston, Missouri, attending the annual Dogwood/Azalea Festival. Fairly early that Sunday morning, George Yatskievych called me to alert me of the new orchid find. It was pouring down rain, and lately it had been tricky for me to walk in wet woods, so I thanked him, and said I might go search for it if it cleared.

It did clear up shortly and Peggie and I decided to go to the nearby Holly Ridge to search for the orchid. From the descriptions George gave me to its locality, I thought I could find it fairly easily, as I have been there many times over the years. In fact, Peggie and I had been there seven years in a row to monitor the *Isotria* in bloom. I did find it right away. Then, Peggie and I searched the area thoroughly for additional plants, but failed to find any. While leaving the area, we met members of the Missouri Native Plant Society going to see the new orchid find. Peggie and I were happy to escort them back to the orchid site. Everyone in this group also made additional searches, but came up empty-handed.

This small, elusive, and hard-to-spot orchid seldom grows any taller than ten inches. The two paired leaves are about midway on the stem, with up to 35 purplish flowers in a terminal raceme. Because the flowers are tiny, one needs the aid of a close-up lens to see details, except for the lip. It is the notable feature, and is split about two thirds way up.

Commonly known as southern twayblade, this is the most recent orchid discovery in the state as of 2009. Twayblade is an old Middle English word in reference to the two leaves about midway on the stem, and it shares this common name with a couple of other twayblades in the state. It is most often found in the southern states from Florida to Texas. Missouri is now at the most northern edge of the range, and this occurrence is some distance from the closest known populations. In the southern states where this orchid most commonly occurs it is found in rich, damp, shady, woodlands at margins of seeps, beds of sphagnum moss, fairly thick leaf litter, and occasionally around the bases of cinnamon ferns among the decaying old fronds.

At the Holly Ridge in Stoddard County, this diminutive orchid is found in a slightly drier habitat than one would expect, but only

a few feet from a small stream of an acid seep . It is shaded by red maple, sweet gum, and tulip tree, and to the west across the seep are white oak. Associated ground species are, *Carex crinita* Lam., *C. debilis* Michx., *Itea virginica* L., *Alnus serrulata* (Aiton) Willd., *Panicum laxiflorum* Lam., *Triadenum walteri* (J.F. Gmel.) Gleason, *Solidago patula* Muhl. ex Willd., *Planthera clavellata* (Michx.) Luer, and *P. ciliaris* (L.) Lindl. On a follow-up visit in late July, we found a beautiful *P. ciliaris* three feet tall in prime bloom only four feet from the southern twayblade's growing spot. The twayblade was no longer visible, as they are known to flower, set seed and wither completely away in a month's time. An unusual flowering form of *Spiranthes cernua*, nodding ladies' tresses, with long narrow leaves up to 10 inches long was also growing nearby.

It is quite interesting to know that the three orchids described as new to science are prairie species, but the three new state records are woodland species.

SPECIES NOT SEEN IN MISSOURI IN MANY YEARS

When the Missouri Native Plant Society was organized 30 years ago, there were four orchid species not seen in many years, and it was thought by many that they were extirpated from the state's flora. In recent times, two of these have been rediscovered, and two have not.

***Isotria medeoloides* (Pursh) Raf.**—The federally listed small whorled pogonia was discovered by Colton Russell in 1897 on a wooded limestone hill near Glenallen in Bollinger County. This remains the only known record for this orchid in the state.

Many individuals and groups of botanists, including Steyermark, have made exhaustive searches in the vicinity, but have came up empty-handed. Mervin Wallace and I searched the area around Glenallen for three days one spring, but failed to find it. We did find a suitable habitat that should be searched on a regular basis. This is another one of our orchid species that is hard to see in its favored habitat due to its small size. It has an unexplained habit of disappearing from known sites for years, then reappearing. The habitat still remains here in the Ozarks for this

rare orchid. Who knows, maybe the small whorled pogonia will still be found.

***Platanthera psycodes* (L.) Lindl.**—The small purple fringed orchid's only known record is on the basis of a flowering plant seen by Julian Steyermark in the wildflower garden of William Bauer in Webster Groves (Steyermark, 1963). Bauer reportedly found the orchid at the Caney Mountain Refuge along Caney Creek near a spring, in Ozark County. On a visit to the site in 1949, Bauer and Steyermark failed to locate any plants. A tree heavy laden with leaves had fallen on some large rocks near the spring where the plants grew, and reportedly smothered the site.

In 1979, while doing research on Missouri Orchids, I went to the Caney Mountain Refuge in search of the small purple fringed orchid. I stopped at the office, and met Danny Billings, who managed the area. We talked for a while about the orchid site, then we went to a maintenance shop where he introduced me to Bernie Morrison, who knew the area well, for his family owned the refuge prior to the Conservation Department's ownership.

Mr. Morrison and I visited awhile and talked about the orchid site. He then gave me a map that showed the spring on it, along with about five other springs in the Caney Creek drainage area. He then said he would take me to the orchid site. He said for me to follow him, and after he showed me the site, I could look around some more. When we got to the spring, he showed me the spot where the orchids grew. He said he was along with Bauer and Steyermark when they visited the site, and he made a comment that he didn't know why Bauer ever brought Steyermark to the site, as he felt sure Bauer removed all the orchids to his wildflower garden.

After Mr. Morrison left, I searched the area well. There were still some limbs left from the fallen tree, held off the ground by some large rocks, which kept them from decaying. I did find some showy orchis (*Galearis spectabilis* (L.) Raf.) and trilliums, but no small purple fringed orchids. I searched the other nearby springs and found nothing but common wildflowers.

According to Mr. Morrison, this spring is just down a short slope from a log cabin where Aldo Leopold once lived. It furnished water for the cabin. I have been back to the site a couple of times over the years, and have been unsuccessful in my searches.

Cypripedium candidum **Muhl. ex Willd.**—Small white lady slipper, a mostly prairie species known only from historical sites, was thought to no longer occur in the state due to the loss of prairie habitats. It was last found in 1947 in Nodaway County by Julian Steyermark. I first visited the area in 1979, along with Art Christ and Karen Haller. Our searches proved unsuccessful. Other individuals and groups have since searched the area without success.

In 1990 while searching a canyon-like hollow in Howell County, Mervin Wallace and I found some very small *Cypripedium* colonies growing along the upper ledges of a bluff. The thought occurred to us it could be the small white lady slipper, but we passed it off as probably the small yellow one, which we had found some about 100 yards away on a north-facing wooded slope. The occurrence of small lady slippers along this bluff ledge kept nagging my thoughts. In late April of 1991, when I thought they might be in bloom, I went back to the site. As I approached the site, there they were, several small colonies all lined up in a row along the edge of the bluff. They were in prime bloom, and they were the small white lady slipper. I was alone and had no one else to share this exciting find with. I shouted—you could hear my call echoing up and down the hollow. There were 47 plants in flower. As soon as I got to a phone, I called Mervin and told him the good news.

In 2001, small white lady slippers were found in Shannon County in a glade, and Dallas County in a savanna. All three of the new sites are not prairies, so maybe this species is adapting to new habitats.

Platanthera leucophaea **(Nutt.) Lindl.**—Eastern prairie fringed orchid was last collected in 1951 by Julian Steyermark in a fen in Carter County. Six plants were seen scattered about the fen. Before that, in 1933, E.J. Palmer and J.A. Steyermark found it in Ralls County in a marsh at the base of a bluff along the Salt River. This orchid is a prairie species. The prairie habitats where it once thrived have virtually all been destroyed by agriculture, urban development, highways, and in some cases, nature itself. Only a few borderline habitats remain. In the case of the fringed orchids with their long floral spurs, their specialized moth pollinators also

Platanthera leucophaea, eastern prairie fringed orchid.

disappear, preventing reproduction by seeds. With dwindling

numbers, some species can't overcome this strain of existence and eventually become extinct.

There is good news however concerning the eastern prairie fringed orchid. Tom Nagel, while investigating a neglected cemetery rich with prairie species in Grundy County in July, 2009, rediscovered this rare orchid. He found several plants just past the peak flowering stage scattered about the cemetery between headstones. This fringed orchid is taller than its counterpart, the western prairie fringed orchid (see the discussion of this species above). Plants at this site appear to be thriving.

This cemetery is much like the one in Henry County, Illinois, where I have observed this rare orchid in bloom. Perhaps an exchange of management plans with those who manage the cemetery in Illinois would be beneficial.

I have been to both of the historical sites in Missouri, and failed to relocate any plants. In talking with the landowner at the Ralls County site, I was told the river had changed course, moved to the base of the bluff, and scoured away the habitat. He was kind enough to take me to the site to see it firsthand.

The Carter County site was bulldozed in 1996, ditches were dug, and the fen drained. While the ground was severely disturbed, sycamore seeds blew in, and now there is a thicket of 13 year old sycamores. It's a shame, for I had found four other species of orchids in this fen, plus other rare plants. What used to be a quiet rural highway passing through the fen is now a high speed four lane thoroughfare, with the sycamores covering a graveyard of orchids, and one tries to discard the past memories from his thoughts.

The year 2009 has been a magnificent year for orchids in our state. Two outstanding discoveries were made. First in April, Justin Thomas found the southern twayblade, and then in July Tom Nagel rediscovered eastern prairie fringed orchid. Both botanists are to be congratulated on their great contributions to knowledge of the orchid flora.

SPECIES THAT MIGHT BE FOUND IN MISSOURI IN THE FUTURE

In closing, I want to leave you with some thoughts on orchids that might be found in our state in the future.

***Cypripedium kentuckiense* C.F. Reed.**—In the rugged mountainous regions of northwestern Arkansas occurs Kentucky lady slipper. Its range extends to the borders of southwestern Missouri. It favors woodland habitats along the wet margins of spring-fed streams. It can be confused with the common yellow lady slipper, but once you have seen both, the flowers are very different. Most often, yellow lady slippers are found on north- and east-facing wooded slopes, but Kentucky lady slippers are most often found in wooded bottomlands along streams and wet swampy woods. On rare occasions, I have found yellow lady slippers along the wet margins of streams, and if not in bloom have always gone back to check them out while in flower. On more than one occasion I was disappointed. It is possible that Kentucky lady slippers could be found in isolated habitats in the southern Ozarks of Missouri.

Cypripedium kentuckiense in Arkansas. Note large opening on the slipper.

***Spiranthes odorata* (Nutt.) Lindl.**—Fragrant ladies' tresses are a species of the southern states that favor wet habitats, and can tolerate seasonal standing water. They are frequently encountered along the Gulf and Atlantic Coastal Plains. There is a dwarf form that occurs in the Appalachian Mountains and east into Kentucky. That is the form that could possibly occur in the lowlands of southeastern Missouri.

For many years I have encountered a *Spiranthes* in southeastern Missouri that has a growth form similar to that of fragrant ladies' tresses. This past season, for the first time, I was fortunate in finding several dozen in prime bloom. The flowers are very much like that species, but did not conform in their flower details. I didn't detect a typical light creamy color or fragrance, leaves were present at flowering time, up to 10 inches long. I felt these were too narrow to be fragrant ladies' tresses. I also didn't detect any plants that I thought to be produced by vegetative rhizomes from a nearby plant, as is typical in *S. odorata*.

In a careful keying process, I had to call the Missouri plants *S. cernua*. It is not the typical form that is commonly encountered. Most often in Missouri, leaves have withered by flowering time, yet the ones I find along the margins of the Ozarks bordering the southeastern lowlands and in Holly Ridge have long narrow leaves at flowering time. I have observed this atypical form in Carter, Butler, Stoddard, and Bollinger Counties. Perhaps future studies will resolve this mystery.

While out on your forays, always keep in mind that orchid seeds are puffy little things that can become airborne and ride wind currents for miles before settling to the ground. New discoveries might be made in unexpected places and habitats at any time.

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HOMOGENIZATION: ECOSYSTEMS LOST IN THE BIOTIC BLENDER

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The 30 year celebration of MONPS is an opportunity to reflect on changes in our lives, friendships, the organization and the basic botanical concepts that guide our Native Plant Society. Decades ago, we traversed Missouri's special habitats willy nillly looking for and observing rare plants, oblivious to the uncertain future of the threats that would forever alter what remained of Missouri's natural world. We believed that state parks, conservation areas, wilderness areas, national forests and national parks would permanently preserve places for diverse natural communities and rare plants. Nature is resilient; plants and animals succeed, we should only burn prairies, damaged landscapes heal when fully left alone, species migrate and adapt in the face of climate change. All will be fine in the hands of entrusted state and federal agencies. Even the verdant hills and valleys of the Ozark Highlands will forever retain that wild character that Henry Rowe Schoolcraft experienced. Or so it all seemed.

Inspired by the passion of discovering Missouri's natural places, I wrote *The Terrestrial Natural Communities of Missouri* (Nelson, 1999, 2005) about our state's natural communities, their biodiversity, and the rare plants that inhabit them. I came to understand the role of fire, perhaps only because Bruce Schuette and I discovered, after the first state park prescribed burn, accidental woodland diversity along the edge of a small restored grassland at Cuivre River State Park. I pushed to expand the burn program, not because I then understood fire ecology, but because of its results. Woodland wildflowers exploded. Ha Ha Tonka State Park became the proving grounds shortly thereafter. This October, over 50 people attending the 2010 Natural Areas Conference field trip will experience the results of nearly 30 years of prescribed burning on a landscape scale at that state park.

Over those 30 years we moved from penciled field notes and typewriters to GIS post processors, digital cameras, and iPhones™.

Biologists use ArcMap® to display the nearly 30,000 element occurrence records (EORs) entered into Missouri's Natural Heritage Database. I remember pasting color dots on old 7.5 minute quad maps for the Natural Heritage Program to signify rare plant and animal locations (I secured the program in DNR in 1981 later to be transferred to MDC). Today, many state and federal biologists depend on the data provided by that program. What it also provides is a glance at the state of our biodiversity. It helps answer the question "What are the trends in rare plant (and animal) populations?" We might not have imagined that was so important back then. Botanical friends then relished in the excitement of discovering beautiful and rare native wildflowers. John Karel established the state park Natural History Program, paralleling MDC's Natural History Program then directed by John Wylie. These programs evolved and flourished for nearly 20 years. Botanists, ecologists, biologists, and naturalists wrote natural area nominations (160 Natural Areas today), state park Wild Area nominations (11 statewide) and stewardship management plans. The Mark Twain National Forest updated its Land Management Plan incorporating 435,000 acres under Management Prescription 1.1 and 1.2 to restore ecosystems. Doug Ladd and Blane Heumann were instrumental in helping designate these 19 areas based on their Ozark Ecoregional Conservation Assessment.

And Doug Ladd and others brought us the Floristic Quality Assessment. I spoke of this at the Anniversary, explaining that Doug and others assigned numeric values to each of Missouri's vascular plant species as a means of determining how confident we might be that plant species were linked to a high quality natural landscape (remnants of the historic landscape) or adapted to the altered modern landscape (a native weed or exotic species). Plant species with high values approaching 10 are deemed *conservative*, whereas weeds or exotics are assigned 1 or 0. By listing species in a given area (a local woodland, glade, prairie, fen, etc.) one can calculate the Floristic Quality Index (FQI), a sort of good cholesterol count of the natural landscape. Weedy places (vacant lots, roadsides, fescue pastures, croplands, yards, abandoned pastures, overgrazed woodlands) have low FQI values while high quality natural areas possess high FQI values. The real value of this system is in its application to assessing trends following management, the effects of environmental disturbances, or

prioritizing what and where we protect and manage. Doug has analyzed Missouri's native and exotic plant species. His analysis reveals that nearly 50% of Missouri's native plant species have a conservatism value greater than 6, meaning that most are dependent on the continued presence and health of historical natural communities. The remaining highest quality natural communities are often directly correlated with the least disturbed, most intact ancient soil profiles. Destroy the ancient historic soil (plow, overgraze, erode, bulldoze, dam, etc.) and so goes the fabric of the native plant and animal species that accrued on this soil for thousands of years. In Missouri, approximately 894 plant species are exotics and nearly 400 plants are threatened or endangered.

THE HOMOGECENE ERA

Google® search "Biotic Homogenization or BH" and you'll come up with more than 43,000 results. We never heard of it 30 years ago, much less what an iPhone® was. BH happens when native localized ecosystems (whether in Missouri or anywhere in the world) are assimilated by widespread exotic or weedy native species, thereby increasing their compositional similarity. Biotic distinctiveness gradually dissolves. So instead of listing 300 plant species associated with a high quality, pre-European prairie, glade, woodland, or wetland natural community, you find perhaps 40 native species and dozens of exotics within the same landscape area. The vegetation in ¼ meter squared vegetation sample quadrats might have an average coefficient of 4.3, but the degraded (homogenized) prairie might only be 1.5. Urban sprawl and all of its related land uses is the primary cause. We must understand its consequences if we are to manage the protected land that houses native flora and fauna. Dr. Volker Radeloff and his colleagues (Radeloff et al., 2005) compiled spatially-detailed housing growth data from 1940 to 2030, and quantified growth for each wilderness area, national park, and national forest in the conterminous United States. Their findings show that housing development in the United States may severely limit the ability of protected areas to function as a modern *Noah's Ark*. Between 1940 and 2000, 28 million housing units were built within 50 km of protected areas, and 940,000 were built within national forests. Housing growth rates during the 1990s within 1 km of protected areas (20% per decade)

outpaced the national average (13%). If long-term trends continue, another 17 million housing units will be built within 50 km of protected areas by 2030 (1 million within 1 km), greatly diminishing their conservation value. Protected areas are increasingly isolated, housing development in their surroundings is decreasing their effective size, and national forests are threatened by habitat loss within their administrative boundaries.

What does this mean for Missouri? Imagine a Meramec River Valley mantled in subdivisions 30 years from now; not good for endangered naiads. Float the upper Meramec River to see the extent of modern housing, manicured yards along the riverbank and cattle bathing in the river. The fragmented checkerboard federal ownership of the Mark Twain National Forest is not immune. We are losing the battle in purchasing privately owned lands from willing sellers and have given up any attempt to purchase lands around Table Rock Lake as land developers continue dividing glade-clad hills, blasting bedrock to build expensive homes.

Homogenization is a primary consequence of housing and land use expansion. It reduces the total area of habitat, divides land ownership resulting in different land uses, renders the historic spread of natural fire useless, and disrupts predator/prey population balances. One of the worse consequences is the spread of many new exotic plant species. Bush honeysuckle was not recorded by Julian Steyermark (1963) but has today spread throughout every urban area in Missouri. My own apartment backyard in Rolla contains bush honeysuckle, autumn olive, oriental bittersweet, Japanese honeysuckle, rose of Sharon, California privet, and winter creeper—is this the ultimate transformed future forest? The process of planting and experimenting with new cultivars will continue bringing additional exotics on the scene. A recent exotic plants inventory of the Irish Wilderness located numerous populations of Japanese stiltgrass deep within this protected Wilderness. George Yatskievych and Joanna Turner first reported it in Missouri in 1990; it has already spread to nearly every county in the southeastern Missouri Ozarks, and research correlates excessive white-tailed deer overbrowsing with its continued spread.

Missouri's historic native ecosystems evolved in response to an unbroken vegetated landscape of large roaming herbivores balanced with predators (wolves, mountain lions, black bear, etc). Today, we have no more native elk nor bison, and no large

predators to control deer. Yes, we have hunters, but more on that later. The tidal wave of white-tailed deer overpopulation has spread with urbanization from the East coast into the Great Plains; control of high deer numbers has become nearly impossible. Deer favor eating sensitive and rare plants rather than weeds. Roger Anderson (1997) concluded that removal of predator control from white-tailed deer populations invites ecological disasters by permitting excessive resource consumption to the detriment of whole communities of organisms, and that wildlife management agencies need to consider maintaining biodiversity in addition to hunter success, revenue generation, crop damage, and car accident claims. Thomas R. Rooney correlated loss of plant species richness in 62 upland Wisconsin forests with excessive deer browse (Rooney et al., 2004). I invite MONPS members to assess the conditions at Engelmann Woods Natural Area and discuss this problem. And it's not just deer. Missouri's wildlife suffer increased predation by feral cats. The American Bird Conservancy estimates that house cats kill 217,000,000 birds and other wildlife in Wisconsin every year. And there's the *Pig Bomb*, an advancing front of concentrated wild pig populations moving northward from the southern states. It's here, and problematic in places like Taum Sauk Mountain State Park.

I presented a graph demonstrating that nearly 80% of Missouri's historic vegetation was fire-mediated. One only has to visit Prairie State Park, Helton Prairie, the glades of Glade Top Trail, Taum Sauk Mountain, Grasshopper Hollow Fen, and other fire-managed landscapes to understand the significant role that fire plays in restoring and maintaining plant species richness and its associated diverse array of wildlife, particularly invertebrate species. But the cessation of fire across the entire matrix landscape accelerates the environmental impacts of homogenization. Sadly the consequences of urban sprawl have eliminated further natural fires. Weakened by decades of open range overgrazing and fire suppression, what remains of fire-adapted, sensitive plant species (royal catchfly, Meads milkweed, prairie fringed orchids, and grass pink orchid, to name a few) continue declining and barely holding on in small protected refugia. The rest will succumb to the smothering blanket of deep leaf litter beneath the shade of dense, young tree and shrub growth.

The bottom line? Over 75% of Missouri's 44 million acres of historic vegetation is completely transformed; most destroyed. The

remaining 25% is fragmented, out-of-character, damaged, fire-suppressed, and subject to exotic species invasion; yes, that includes national forest, state park, conservation areas, and other public lands. Much is restorable but will it remain viable in the long run? It is from this fragmented landscape that we must decide where it is best to restore and retain viable biodiversity.

HOW DOES HOMOGENIZATION AFFECT THE SUCCESSION AND SPECIES/ECOSYSTEM MIGRATION CONCEPT IN THE FACE OF CLIMATE CHANGE?

While in graduate school 35 years ago, I was introduced to historic vegetation timetables linked to changes in climate. I believed in Dr. Julian Steyermark's *Vegetation History of the Ozarks* and the assumption that the Ozark flora was changing in light of a wetter climate. He said fire was destructive. Others exclaimed that by leaving nature to its own devices, vegetation and wildlife would recover from the consequences of the Great Cut, 100 years of open range grazing, or mining. I was educated to the concept of *plant succession* which I think still operates in the Canadian Shield North Country. I read an article several years ago in the *Missouri Conservationist* that old fields surrounded by Ozark oak forests eventually succeed back to forests. Clements et al. (1929) taught that a plowed cropland in the middle of a virgin prairie would revert back to its original state in 50 years. Others exclaim when faced with the consequences of climate change that prairie-grasslands will migrate toward the East Coast (National Geographic Magazine, 2008); post oak and shortleaf pine will migrate north; that glades and savannas will do the same, and that new orders of plant assemblages will follow that we botanists will get excited about.

But in reality, long term vegetation monitoring, floristic quality indexing, ecosystem assessments, natural features inventories, and threats assessment research are revealing something entirely different. It is this profound difference that must reshape our thinking about the state of our present flora and the certain future pathways of change—most not good if you wish to hold onto the past natural assemblages of historic vegetation and rare plants. Remember too that if we as a Native Plant Society wish to

continue experiencing rare flora, then we must actively manage natural communities to retain their critical habitat.

So how does a glade with all its 250 plus plant species and desert-adapted animals make the journey across unburned, overgrazed woodlands, roads, croplands, fescue fields, and urban sprawl? What bedrock soil to the north is suitable for this pilgrimage? How does a diverse prairie ecosystem or a rich grass/forb post oak woodland migrate anywhere when the historic fire-matrix disturbance process has been halted? I demonstrated that such a migration would run smack into an impenetrable iron curtain of 300 miles arching across Nebraska, Iowa, Illinois, and Indiana. A curtain beyond which exist vast cornfields cropped clear to the road-margin or cool season pastures filled with livestock. And how do grasslands of the Great Plains migrate across a gauntlet of Missouri fescue fields, highways, croplands, and urban sprawl?

SO WHAT MUST WE DO?

Society and MONPS can do little to alter the growth-trend or development patterns. However, our conservation leaders can plan for the consequences of homogenization, if they choose that biodiversity is high on their list of conservation, preservation, recreation, or other multiple–use purposes. But the inevitable political winds of time have changed everything. New organizational management concepts have emerged: decentralization, rightsizing, downsizing, and the economic downturn. The result? MDC's natural history program is disassembled. The Missouri State Park System's Natural History Program is absorbed. People with passion and willingness to take risks in times of uncertainty are retiring. So how do the ideals of 30 years past survive? How do we combat the homogenization process?

We must first accept the inevitable. We are part of the homogenization process and it will not abate. The old botanical theories of plant succession, species migrations, and reaccrual of species-rich ecosystems on the move in the face of climate change are not going to operate effectively, at least in the Midwest. What are the choices? Some say nature is resilient and there will be new combinations of plants and animals ready to adapt to a new world. Thus far, plant monitoring and research is revealing a new world

TIME PERIOD	HUMAN INFLUENCE	GENERAL MISSOURI VEGETATION	EFFECTS ON BIODIVERSITY	
Pre-12,000 BP	Initial Native American settlement: Big game hunters	Boreal Forest	Continental-scale functioning ecosystems Predator-prey-herbivore food chain, ancient soils rich in free-roaming species mantle landscape	
	10,000 YEARS NORTH AMERICAN	**LANDSCAPE BURNING BY NATIVE AMERICANS**		
12,000–8,500 Cool humid	Hunting, short term settlements, widespread landscape fires	Oak-hickory woodland and forest; savanna northern Ozarks	Appearance temperate deciduous forest; southern swamp trees.	**Vegetation structure; plants/ animals directly influenced by landscape burning**
8,500–4,500 Warm dry	Hunting, short term settlement, widespread landscape fires	Appearance and expansion of short grass prairie; grasslands and savannas expand due to Native American burning	Southern species expand northward; grasslands. Biodiversity still intact	
4,500–1,000 Warm humid	Appearance domesticated plants; limited agriculture, increased fire; clearance bottomlands for fields	Some fragmentation bottomland forests by native Americans; oak pine woodlands and savannas maintained by Native American burning	Expansion of fire-adapted natural communities; Biodiversity intact	
1,000–200 Cool humid	Pre-European appearance; sedentary agriculturists; substantial impacts from large villages; landscape fire	Increasing impacts from fields and large villages; deforestation in some areas; oak pine woodlands maintained by Native American burning	Biodiversity intact; some disruption riparian vegetation and wildlife	
	EUROPEAN SETTLEMENT	**EXPANDS; INITIATION RESOURCE EXTRACTION; NATIVE AMERICAN DISPLACEMENT**		
250–150	Native Americans displaced from Missouri	Some increasing woody structure due to loss native herbivores; some lack of fire	Reduction fur-bearing wildlife due to trapping and overhunting	
	DESTRUCTION VIRGIN TIMBER;	**PLOWING PRAIRIES; OVERGRAZING/SOIL EROSION**		
150–100	Intensive European settlement, agriculture, overgrazing; industrial pollution-CO2 increasing	Expanding soil tillage and erosion; Historic vegetation out of character; no virgin trees	Elimination large herbivores and their predators; some extinctions	
	COMMENCEMENT	**CONSERVATION EFFORTS 1930s**		
100– present	Urban expansion, commercial agriculture, commercial logging, mining, overgrazing; livestock fencing, damming of rivers; channelization, air and water pollution: conservation practices of natural resources increases.	Fragmented natural communities; increase in exotic plant and animal species; fire-adapted natural communities degrade or disappear; establishment public lands to protect forestry, fish, wildlife, landscapes	75% original virgin ecosystems destroyed; remainder out of character and degraded from presettlement condition; conservation of some resources; feral cat predation; disruption genetic flow due to fragmentation/reduced population size	
	AGRICULTURE, URBANIZATION,	**AND HOMOGENIZATION INTENSIFIES**		
Future	Rapid urban expansion, private land use-extraction continues; soils destroyed, native vegetated lands adjacent to state-federal ownership diminish	Widespread conversion to exotic species; cropland; urban landscaping; climate change effects, further fragmentation private natural landscapes	Native species richness declines, loss of genetic diversity, extinctions; generalist plant and animal populations expand, biodiversity mission not a priority among government land managing agencies.	

Uncontrolled Landscape Burning

Figure 1. Historical summary of effects of changes in land management on Missouri biodiversity. Adapted from Nelson (2005), Table 1, p. 8.

succumbing to weeds. Rogers et al. (2008) and others have observed that in the face of changing vegetation structure and patterns, species richness declines with no corresponding accrual of new species adapted to the different environment. Show me one example of an unmanaged savanna, woodland, or prairie that has, left to its own devices, restored itself.

What is certain is that plant (and corresponding animal) species richness associated with variable natural communities is at its best within those landscapes that have been actively restored and maintained, primarily fire-adapted ecosystems. The answer is: continue restoring ecosystems based on what we have experienced the past 30 years. The challenge is to select the best places across Missouri's diverse ecoregions in which to do so. We have Conservation Opportunity Areas, Bird Initiatives, and TNC Portfolio Areas.

There's truth to the certainty of death, politics, and taxes. I've lived long enough to experience six governors, seven DNR directors, seven State Park directors, five MDC directors, three Forest Supervisors, and eleven Presidents. All bring their own (respectfully) unique and distinct histories, desires, and aspirations. These shape agency priorities. I've not yet truly experienced even one that placed biodiversity at the top of their priority list. And sadly, unless people in the lower ranks of land managing agencies are hired with the passion to restore ecosystems, other tasks take precedence and excuses (resistance) will prevail. One only has to visit Ha Ha Tonka, Cuivre River, Pershing, Taum Sauk, Trail of Tears, or Pomme De Terre State Parks to experience extraordinary restored natural communities and their rare assemblages of plants (and animals), and to realize that behind the landscape is someone with the passion and perseverance (to the point of losing his or her job) to ensure that fire-adapted natural communities are cared for. Look elsewhere at state parks with damaged ecosystems lacking fire and you will find resistance in the form of various excuses. That person has little passion for the resource or works for someone with different ideals. And this also applies to the Mark Twain National Forest, whether it is achieving timber targets or grazing fescue pastures. Unfortunately, politics and Congress drive timber priorities, but I hear (read the current U.S. Forest Service website) that all-lands ecosystem restoration (to make our forests

more resilient to climate change, diseases, etc) is coming. Just give it a dedicated budget.

Another 17,000,000 houses are projected to be built in the next 20 years across the U.S. We must embrace landscape transformation (whether we like it or not) and its consequences—a planet of weeds and gardens. If we wish to keep relicts or islands of diverse historical landscapes, we must design, preserve, and manage diverse ecosystems that occurred at the time that early European explorers first entered Missouri. In the long run, absolute hands-off landscapes will suffer the infringement of homogenization. Perhaps it's best to think of historic natural landscapes as important historic buildings, places, or events. Historic buildings need constant care and upkeep to prevent the processes of time from destroying them. If you wish to keep a fire-adapted ecosystem, there must be fire; maintain a high quality wetland system, then keep development out of a watershed; a healthy woodland or savanna free of exotics, then a landscape covered in rich native groundcover. You must keep exotic invasion in check, bring deer numbers below historic levels, and demand that land protection agencies actively restore ecosystems (and this means hiring leaders with a passion to do so).

We have the resources: people, money, time. We have strategies: state park resource stewardship plans and policies; MDC Comprehensive Wildlife Strategy; Mark Twain National Forest Plan ecosystem restoration objectives; and The Nature Conservancy's Ozark Ecoregional Conservation Assessment. But the statewide scorecard for ecosystem restoration work accomplished is far from achieving the goal. Resistance prevails in many forms. Budget cuts, layoffs, other priorities, manager philosophies, changing leadership, decentralization.

Perhaps toughest of all is our acceptance that relict plant species richness and quality ecosystems will in many places fall victim to the homogenization process. Protecting ecosystems is time consuming, expensive, and requires a constant dedicated commitment. I'm convinced that such a commitment requires that we institutionalize the idea of ecosystem restoration as a primary driver behind what land managing agencies and private nature organizations do. But changing politics, new leaders with their own aspirations, and the eventual *retirement* of those with passion and

Table 1. Native Biotic Homogenization Process. Chronology of Departures from Pre-European Settlement in Missouri.

1. **1600s:** Initial contact by early explorers; diseases decimate Native American population. Use of fire and agriculture disrupted or modified.
2. **1700s:** European hunters and trappers permeate North American landscape. Bison, elk, wolves, mountain lions, black bear removed from food chain to extent dysfunctional in predator/prey relationship.
3. **Early 1800s:** Homesteading and town settlements commence along major rivers, expanding westward. Large corporate timber mills extract virgin timber up to early 1900s. Little intact virgin timber remains today.
4. **Mid 1800s to mid 1900s:** Free-roaming cattle, hogs, horses, goats and sheep associated with widespread settlements and livestock industry overgraze native prairies, savannas, woodlands and glades resulting in loss grass/forb structure, soil erosion and increases woody growth (red-black oak, red cedar, sumac, etc).
5. **Late 1800s to early 1900s**: Virgin prairie plowed for agriculture or hayed for decades. 13 million acres prairie reduced to 60,000 which is fragmented and degraded.
6. **Late 1800s to mid 1900s:** Most streams and rivers in agricultural landscape (North Missouri, bootheel and Missouri/Mississippi Rivers) channelized and dammed. Many wetland marshes and swamps drained and destroyed.
7. **Early to mid 1900s:** Poor farming practices and channelization result in extensive soil loss and stream/river siltation. Hydrologic processes shift from soil infiltration to surface runoff.
8. **Early to mid 1900s:** Exotics introduced for experimental livestock forage, wildlife, horticulture, crop production, gardens, accidentals: Exotic plants and animals begin invading damaged or destroyed ecosystems and abandoned (soil depleted) lands.
9. **1930s**: Conservation agencies established to restore wildlife, plants, soil and other natural resources. Begin setting aside acres for variety of conservation/preservation goals.
10. **Early 1900s to Present**: Increasing human population in Missouri (more than 6 million) and ever-changing purchase/selling of private lands fragments landscape including massive network of roads, railroads, urban expansion, industry, utility lines, mining and quarrying.

Table 2. Projections and Consequences of Continuing Homogenization Process.

1. Given that virtually all remaining moderate quality prairies, savannas, woodlands, glades, fens, wetlands are highly altered and out of character from their historic counterparts, including intact species associations, disruption historic processes (fire, soil hydrology, stream/river flood regimes), large predator/prey relationships, connectivity. Nearly all need attention to active management to restore and sustain them at some large scale.
2. Homogenization is the gradual loss or genetic assimilation of Pre-European plant and animal assemblages associated with ancient, intact native soils to extent that non-native exotics, generalist wildlife and weedy native plants become dominant, especially damaged or destroyed ecosystems, and those in poor to even fair condition.
3. Host-specific insect pollinators, micro invertebrates, etc associated with specific soil/ecosystem biota are decreasing or confined to higher quality relict natural areas.
4. Destroyed and altered soils (now in croplands, old fields, sedimented floodplains, exotic pastures, home lots, roadsides, etc) hold little promise for immediate accrual, succession or migration of conservative plants resulting in newly-established, highly diverse ecosystems.
5. While certain plant and animal species (especially generalists most adaptive to modern human landscapes) may migrate northward in face of climate change, diverse assemblages associated with natural communities will likely not, especially since it takes 1,000s of years for soils (along with their evolutionary processes) to recover.
6. The timescale of change or modification of the genetic memory associated with highly-diverse natural communities is measured in centuries, not fiscal years nor a human lifetime.

initiative to fight make this extremely challenging. There's no more Natural History Division in MDC; no Natural History Program in state parks. Ask whether the Forest Ecologist position I hold at the Mark Twain National Forest will be refilled when I retire soon. At least, 30 years after its birth, the Missouri Native Plant Society is one of few organizations that places plant diversity and ecosystem restoration at the top of its agenda, and continues to fight for the cause of restoring ecosystems. Will future Board members engage the battle?

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SUSTAINING OUR NATURAL HERITAGE: TEN (SUGGESTED) CONSERVATION COMMANDMENTS

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[The following synthesis is distilled from my presentation at the 30th anniversary celebration of the Missouri Native Plant Society, 26 September 2009, in Fulton, Missouri, and my opening address for the Wild Things Conference, 7 February 2009, in Chicago.]

In recent years there has been growing realization of the essential role of healthy ecosystems in sustaining a productive, vibrant human society. There is widespread agreement among diverse segments of society that it is a worthy goal to conserve the planet's natural heritage and healthy ecosystems for multiple reasons ranging from pragmatic and utilitarian to aesthetic and ethical. However, the reality continues to be bleak: functional ecosystems and their component biota continue to be degraded and lost at alarming and often increasing scales around the globe.

Nowhere is this more evident than in the fragmented landscapes of midcontinental North America. Here large portions of states such as Illinois and Missouri once contained the most diverse and productive phase of what is now the most endangered, least conserved terrestrial habitat type on Earth—temperate grasslands—embodied locally by our tallgrass prairies and their associated woodlands. These systems sustained and shaped our history and culture from the advent of human occupation of the region, and our stewardship and restoration of them, or lack thereof, will significantly affect the quality of life for future generations.

IN THE BEGINNING: A BRIEF ECOLOGICAL REVIEW

During the past four billion years, as continental land masses formed, ebbed, and meandered across the surface of our planet,

living things have influenced and been influenced by the physical environment, evolving, diversifying, and radiating in direct response to physical and evolutionary opportunities and constraints. The result is an unimaginably diverse and interrelated complex of life forms and ecosystems, each supremely adapted to the site conditions, process regimes, and biological interactions present at that specific locus and time period.

Only 15,000 years ago, the northern portions of our region were under thick masses of glacial ice, and the entire area was influenced by the proximity of a continuous mass of ice extending northward to the pole. Glacially-influenced climate patterns in the region supported vegetation similar to what one might find today in areas far to the north in Canada: spruce-fir woodlands, jack pine parklands, and other cold-adapted systems.

Since that time, as the climate warmed and fluctuated within a range more evocative of our modern weather, the ice sheets retreated by fits and starts to reveal their legacy of deposition and contour alteration. This new landscape and climate supported a different combination of biota and natural communities, which were profoundly influenced by a new force at once both organism and process regime: humans. The 14,000 year legacy of humans in the Midwest has shaped the genesis and perpetuation of our post-glacial biological systems. One of the most wide-ranging and significant impacts has been that of human fire, which vastly outnumbered lightning-caused ignition frequencies and fire coverage in the landscape. This history of thousands of years of deliberate wildland aboriginal ignitions has resulted in the contemporary matrix of fire-dependent natural communities in virtually every terrestrial landscape in the Midwest, as demonstrated by the grassland biogeographic influences evident not only in our prairies, but in our woodlands, forests, and even wetlands.

The take-home from the recent retreat of the glaciers and genesis of human-influenced natural communities is that our modern ecosystem, although composed of biota reflecting a multi-billion year evolutionary lineage, is young—15,000 years being a blip in biological time. A mere 20,000 weeks ago, this young system was then subjected to the most rapid and catastrophic continental-scale impact to hit the planet in the past 65 million years. This occurred when Old World humans resettled the New World. In a single stroke, the largely hunter-gatherer, nomadic

pattern of human influences on the land was replaced by a culture predicated on permanent population centers and intensive agriculture focused on a few domesticated species.

This recent influx of humans arrived in the New World complete with their camp followers: legions of wanted and unwanted plants and animals specifically adapted to the impacts and processes imposed by their sedentary agrarian society. North America's native systems and their component biota are completely unadapted to this intensive land disturbance, fire suppression, and associated impacts. In the contemporary landscape, native biota are thus often less competitive than a host of introduced species which, through thousands of generations of evolutionary adaptation and selection, have become adapted to, and sometimes dependent on, the disturbances imposed by Old World cultural patterns. Our native biota is still reeling from this impact. It is hard to convey the scale, intensity, and especially the rapidity of this impact in biological time, since we tend to measure time in the scale of human experience, but the impacts of Euro-settlement are still radiating through the biological fabric of our region—the sound waves from an ecological gunshot still echoing across the landscape.

These impacts have intensified with the increasing technological sophistication of human society. For tallgrass prairies, the ecological nadir was attained in 1837, in Grand Detour Illinois, when Vermonter John Deere developed the first effective steel moldboard plow. This enabled the deep, fertile, carbon-rich soils that were the product of thousands of generations of prairie vegetation to be exploited for food production, simultaneously scribing the epithet for most tallgrass prairies and turning the region into the breadbasket of the world. In the process, a system with more than a thousand species of flowering plants was converted into endless rows of two non-native grasses and an Asian legume.

REALITIES OF CONTEMPORARY CONSERVATION

Sometime around May 23, 2007, the world underwent a profound change. For the first time in history, there were more people living in cities than in rural regions. In part a reflection of growing world population, this illustrates the increasing pressures

on natural systems around the globe. Conservation success will mean making societal decisions that both meet the growing needs of human populations and ensure that the natural systems upon which we ultimately depend for providing healthy soils, clean water, and other basics of life are sustained and retain the full array of diversity to ensure ecological resiliency and viability.

This will not be a trivial feat. Today there are about seven billion people on Earth, and this is projected to increase to eight billion in less than 20 years. Population in Missouri and the Chicago Region is expected to increase by more than 20% in that time. During the same interval, global per-capita caloric intake is projected to rise 10%, as people in developing nations acquire better diets—and this will be exacerbated by an increasing consumption of meat, and the energy inefficiencies associated with meat production. Degradation from climate change, ecologically and economically destructive invasive species, and irreversible historic impacts to ecological health and economic productivity in many of our most productive lands render the situation even more challenging. With 40% of the Earth's total land area currently in some type of agriculture or pasture, sustaining this increased productivity without negative impacts to our remaining natural habitats and waters will be daunting. It will require the full integration of economic, societal, and conservation needs into the fabric of every decision and action.

People have long recognized the need for resource conservation. In the New World, this was evident as early as 1620 with the first sea turtle regulations in Bermuda. Since that time, driven by multiple goals ranging from pragmatic to esthetic and moral, numerous policies and approaches have been developed to meet human and ecosystem needs, with varying degrees of success. At the same time, our increasingly sophisticated technology has fostered a growing disconnect between people and the natural systems upon which we ultimately depend. This disconnect is both spatial and temporal, as modern technology allows us to defer the consequences of bad decisions across areas and intervals—bad decisions such as expending thousands of years of prairie-accumulated soil tilth and fertility to unsustainably produce a few decades of high-yield crops, or vast energy expenditures to transport resources and abate the consequences of locally unsustainable practices.

As a result, the majority of people, both in our region and throughout the world, have become personally disenfranchised from the natural environment. This is certainly the case for the populace as a whole, as exemplified by the concept of "nature deficit disorder" portrayed in Richard Louv's book, *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*[1]. I submit that this is also increasingly the case for conservation practitioners, as we become ever more enamored with models, theories, and "big picture" philosophical approaches, even as our institutions of higher learning become ever less proficient at research and education activities requiring organismal expertise. With modern research and academic agendas often driven by funding opportunities and prestige, vital fields of study and knowledge are withering, even as the need for them has never been more acute.

Regardless of models or grand theories, the only immutable truths in nature are those to be learned from the performance of the biota. Discerning these truths requires a culture with the commitment to train and nurture a vibrant community of experienced field practitioners engaging in a disciplined, deep immersion in understanding the individual organisms that comprise our ecosystems—beginning not least with the ability to competently identify them in the field. It is depressing for human society that, even among cutting edge conservation institutions and

[1] (Algonquin Books, 2005). However, as an eminent Illinois ecologist has pointed out, it seems glib to ascribe the dire state of contemporary conservation solely to lack of children's immersion in nature, since the immediate previous generations, who putatively grew up more immersed in nature than did contemporary generations, were responsible for the most intensive epoch of deliberate habitat destruction in world history.

agencies, field organismal biology is increasingly regarded as a quaint, outdated, almost Victorian pursuit that has outlived its utility [2].

SUSTAINING OUR NATURAL HERITAGE AND A VIBRANT, PRODUCTIVE SOCIETY

If we are to succeed as a sustainable society that allows future generations to have the opportunities and resources that have benefitted us, we must embrace a new vision that integrates conservation and human needs into the fabric of our thinking. Depending on the specific situation, the two factors will be weighted differently, but the old paradigm of a polarized model where either one or the other reigns absolute must be replaced with something more reflective of ecological sustainability and the realities of contemporary society.

We must not only recognize, but celebrate, our dependence on functional ecosystems and the role of humans in shaping and sustaining our post-glacial natural environment. By accident of biological and human history, this region contains unique and irreplaceable resources of global conservation significance, including the remnants of the most productive phase of Earth's most imperiled terrestrial habitat type. For both practical and ethical reasons, we have a sacred obligation to ensure that the full spectrum of this precious biological tapestry is maintained in healthy arrays. To that end, I propose ten conceptual conservation commandments for achieving successful conservation of our natural heritage and a viable planet sustaining healthy human societies.

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[2] A compelling account of this is provided in biologist David Ehrenfeld's essay, "Vanishing Knowledge," which appeared in, *Beginning Again: People and Nature in the New Millennium* (Oxford University Press, 1994) and was reprinted in *The Sun*, December 1995, and *Harper's Magazine*, March 1996. It includes a searingly poignant summary: "I fear for us when there is no one left in our places of learning who can tell one moth from another, no one who knows the habits of hornbills, no one to puzzle over the diversity of hawthorns, no one to even know that this knowledge is needed and is gone."

1. Recognize Our Ignorance.—We need to recognize, but be not paralyzed by, how little we know about our native habitats, ecosystems, and their component biota. As a society, we lack the knowledge and technological capability to even identify every organism in an acre of high quality native prairie, let alone begin to construct a cogent assessment of the complex interrelationships and dependencies these organisms have both among themselves and with the physical environment. It is humbling that we have the responsibility to restore, manage, and sustain complex biological systems, habitats, and populations while veiled by this blinding cloak of ignorance. All too often, we tend to believe our own hyperbole regarding the state of our knowledge, displaying the hubris of thinking that, for the first time, we have finally figured it out, just as countless individuals and generations on whose knowledge we stand have thought before us. It is time to adopt a more realistic assessment and recognize that much remains unknown, and that there are undoubtedly errors in our contemporary thinking that will be revealed iteratively in the future. Conservation action must not be held hostage by these knowledge gaps, but we also must have the humility to accommodate uncertainty, eschew deterministic "end-state" models, and commit as a society to continually operate in a context of action, humility, uncertainty, and willingness to learn and adapt concepts.

2. Glory Be Unto the Organisms.—Humans must re-embrace nature at its most fundamental level, celebrating biodiversity and empowering organismal expertise at various levels across broad swaths of society. We must embrace a societal commitment to immerse humans in nature, cultivate a stewardship ethic and sense of obligation to the landscape, facilitating knowledge and hands-on experience. Successful conservation requires a bivalent vision for success – we must conceptualize, plan, implement, and innovate at regional, landscape, continental, and global scales, even as we remain disciplined to monitor success at the collective organismal level, for nothing else is a fundamental gauge of true conservation success. Success measures should be explicitly linked to organismally-based responses enfranchising broad spectra of biotic diversity, and these outputs should drive an adaptive management decision process.

3. Celebrate the Essential Role of Humans.—Humans have been an essential factor shaping the genesis and perpetuation of the post-glacial environment, and our native biota and natural systems have an obligatory dependence on an ongoing, interventionist human role. We must establish a societal paradigm of humans as an integral part of the natural world, while simultaneously inculcating the need for human activities to be attuned to system constraints and bio-historic precedents. This includes avoiding a philosophically derived "wilderness" mentality seeking to "protect" nature from humans—an aberration without biological precedent in post-glacial North America. We need to focus on pragmatic conservation and sustaining irreplaceable constellations of biota. Rather than a constraint, this is an opportunity to fully involve society in an ongoing hands-on interaction and immersion in our natural heritage, while cultivating a collective stewardship ethos.

4. Honor the Past, But Return Not.—Conservation success requires that we be cognizant of the past and learn from it, while not engaging in counterproductive attempts to recreate a static version of past ecosystem or habitat states. All too often, previous conservation efforts have either rigidly tried to preserve or reconstruct static historical artifacts or else blithely assumed that succession and change were "natural" and ecosystems were unsnappably elastic, rendering biological history of no value. In reality, the organismal richness underpinning stable systems evolved as assemblages of biota under a specific range of conditions, meaning that these systems function within a window of constrained dynamism within which they and their component biota will flourish and in turn enable us to flourish as a society. It is thus requisite to understand in detail the conditions, process regimes, and range of variation within which these systems existed in the pre-Eurosettlement period, and to emulate conditions, biotic relationships, and process regimes within the amplitude of this constrained dynamism. The goal is not to create a static preconception, but to allow the flourishing of the full array of native organismal diversity that characterized these systems and habitats prior to the depauperizing impacts associated with Eurosettlement. From an individual perspective, we can be

enriched through learning the human and biological history of the locus on Earth's surface that we inhabit.

5. Know Thy Enemies.—We must develop systematic, concise, nuanced, and predictive, science-based analyses of threats to the long term viability of our natural systems and their component biota. This will require the discipline to look beyond what "seems" to be bad, and instead use data to determine the actual threats which, if unabated, are likely to expunge or degrade irreplaceable facets of our natural heritage. I suggest recognition of three categories of threats and the differences inherent among them: 1) historical impacts creating current threats and thus requiring remediation; 2) current threats requiring abatement; and 3) future threats that require deterrent actions in the present. We must learn to effectively determine true, not perceived or emotionally-sensed, impacts of threats, and have the discipline to ensure an objective, science-based approach targeting resources accordingly. This will require credible measures for assessing threat abatement, and developing and implementing unified threat abatement strategies that accommodate economic and societal needs.

6. Explicitly and Emotionally Value Nature.—To erode the divide between much of contemporary society, its decision-making processes, and the natural world, we must value nature from both pragmatic and cultural perspectives. This means suffusing across society an enthusiasm for and understanding of why biodiversity is critical to human well-being. People should have pride in the significance of local and regional biodiversity and its role in defining us as a culture and imbuing a sense of place. Planning and land use decisions should include explicit valuation of the economic services provided by healthy natural systems, including considerations of future value of services and long term costs of replacing these services if ecosystem function is degraded or lost.

7. Be Vigilant in Protecting the Irreplaceable.—Despite laudable progress and achievement in ecological restoration, human society lacks the ability to restore any natural habitat to the level of diversity and function of its natural congener. This mandates that we effectively conserve and steward existing natural areas and high quality habitats and remnants, since they are by definition

irreplaceable. Conservation practitioners must engage society to vigorously defend areas with remnant biological integrity against the "death by 1,000 cuts" scenario, whereby any one example is considered expendable, despite the impoverishing impact on the health of the whole. We must use science and documentation to adjust societal expectations to be intolerant of "acceptable" loss levels or degradation of priority natural habitat and inject the concept of irreplaceability into societal dialog.

8. Avoid False Prophets of Simplistic and Universal Greenery.—People like simple, feel-good solutions, and as a society we tend to oversimplify complex ecological issues. This is exemplified by reductionist propaganda (and misguided regulation) such as planting trees is always a beneficial "green" solution to environmental woes, in promoting highly subsidized inappropriate biofuel production or unrestricted wind farms to cure our energy issues, and other damaging thinking. We as a society must learn that dealing with complex systems and problems requires acknowledging complexity and the need for a nuanced series of strategies and solutions. Every action (or non-action) has consequences good and bad, and these consequences do not play out consistently across landscapes, habitats, and human communities. Conservation success mandates recognition of the uniquity of habitats, biota, and societal interactions at each spot on the Earth's surface.

9. Nurture a Permanent Stewardship Ethic.—The regional conservation community must instill an understanding of the ongoing interdependency between human society and natural habitats, inculcating cultural expectations of permanence, continuity, and an obligation to future generations. This can be an uplifting opportunity to enfranchise people as collective curators of our natural heritage, celebrating a sense of place here as nowhere else on Earth (even as the same is replicated endlessly around the globe); we should regard this as both our responsibility and our great privilege. The resultant stewardship ethic also has the potential to produce societal benefits beyond the immediate conservation benefits achieved.

10. Grow Beyond Local Borders.—Even as we recognize the importance of our region's natural heritage to both local and global conservation success, we should strive to develop mechanisms to export and adapt lessons learned, and to learn from others outside of the region. Both successes and failures have value beyond the region where they occur. Societal success means conservation being embraced locally everywhere across the globe. Our region is positioned to play a pivotal global role, both for the unique biological systems and biota conserved, and for our long legacy in projects such as Chicago Wilderness and Kansas City Wildlands, which are model platforms for intimately fostering an ongoing recognition and relationship between people and the natural systems that sustain us.

AND SO...

Achieving these societal transformations and achievements will enable the opportunity for success, but will by no means guarantee it. Our challenge is nothing short of suffusing an understanding of the role of nature and a full integration of conservation issues across human society, ensuring full awareness of humanity's ultimate dependence on our natural systems. Conservation, economic needs, and other issues are not equally weighted across the natural and cultural landscape, but each should be considered in the decision making process, whether the area is a unique prairie habitat or an industrial parking lot. Decisions should be made with the understanding that all actions have social and ecological consequences, that success means meeting both societal and ecological needs, and that some habitats and lands contain irreplaceable natural heritage that directly benefits all of us. Success will not be will not be quick, easily measured, or effortless; hard decisions and compromise will be required. I believe the fate of human society depends on achieving this, and it is the measure by which future generations will judge us. As never before in human history, we cannot afford to fail.

KUDOS

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A BRIEF CHRONOLOGY OF THE MISSOURI NATIVE PLANT SOCIETY: 1978–2009

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The present summary of important events in the history of the Missouri Native Plant Society is intended to expand and update a more in-depth historical account that was compiled by the author and published on the occasion of the Society's twentieth anniversary in 1999 (*Missouriensis*, Volume 20).

1978	John Wylie and James Henry Wilson of the Missouri Department of Conservation's Natural History Section invited interested professional and amateur botanists to Jefferson City to discuss the possibility of forming some kind of a native plant society.
October	At a meeting of botanists to discuss the status of rare plants in Missouri, Wylie and Wilson offered to assemble, in the spring of 1979, an ad hoc steering committee to plan an organizational meeting for a native plant society.
1979	Eight members of an *Ad Hoc Steering Committee of the Native Plant Society* met in Jefferson City to discuss the future of such an organization and write a draft set of by-laws. Group also nominated a slate of officers for the Society. Paul Nelson of the Missouri Department of Natural Resources and Jim H. Wilson of the Missouri Department of Conservation were asked to prepare a program and arrange for a centrally located site for a native plant society organizational meeting.
March 30	
June 2	Approximately 60 people met at the Coulter Science Center on the campus of Westminster College in Fulton to launch formally the Missouri Native Plant Society (MONPS). By-laws were adopted and first board members elected. Society newsletter name changed to *Missouriensis*.
Summer	First issue of *Missouriensis* published. This issue contained a call for an inventory of the plants of Missouri.

September 1	First meeting of the Missouri Native Plant Society Board of Directors (BOD).
November 9	MONPS officially recognized by state of Missouri as a General Not For Profit Corporation, and the Missouri Secretary of State certified the articles of incorporation of the Missouri Native Plant Society.
December 1	Second meeting of MONPS BOD established important precedents governing the meetings of the Society: future meetings of the BOD would be held in different parts of the state, and part of the meeting would be field trips in the local area. Julian A. Steyermark was designated the first *Honorary Life Member* of MONPS.
1980	First annual meeting. BOD agreed to sponsor a project
June 7	suggested by Wallace R. Weber of Southwest Missouri State University for a manual of the Missouri flora which would update Julian Steyermark's *Flora of Missouri,* and be more readily useable in the field.
Fall	MONPS had matured to the point that certain organizational limitations had become apparent. In an attempt to correct those deficiencies, BOD created six committees: editorial, field trips, membership, nominations, political action, and inventory research. Political action title shortly changed to environmental action as being more indicative of the committee's real focus.
1981	BOD approved the Society's suggested logo design
March	submitted by Mr. James of Kansas City. BOD agreed to examine subject of establishing local chapters of the Society.
June 12	BOD amended Society's by-laws to set the procedures for the organization of regional or district societies of MONPS.
Winter	Winter *Missouriensis* (Vol. 2, No. 3) issued invitation to anyone or any organization that had an interest in becoming an *Affiliate* of MONPS. It also carried announcement about plans for updating Missouri plant records, with documented records to be published in the Society's journal.
1982	BOD agreed to purchase of cloth patches and paper
March	decals of the Society's logo. Group in southern Illinois applied to become the first MONPS local chapter. BOD granted this request "with pleasure" and Southern Illinois Native Plant Society became first MONPS local chapter.
June 5	MONPS conducted a well-attended botanical inventory workshop demonstrating how to construct a plant press, and providing information about drying plants, instructions on the ethics of plant collecting, plus the

	procedures and locations where plants could be collected.
June	BOD announced that the IRS finally had accepted MONPS as a *Not for Profit* organization with all the privileges and responsibilities that status entailed.
Summer	*Missouriensis* summer issue (Vol. 4, No.1) printed first fruits of the effort sponsored by MONPS for an updated botanical inventory of the state with the publication of some of the county plant records gathered in the MONPS inventory project.
1983	
February	Joint meeting of MONPS and the Missouri Prairie Foundation at the Missouri Botanical Garden.
April	MONPS cosponsored, with the Federated Garden Clubs of Missouri, a wildflower workshop at the Lake of the Ozarks, with about 450 people attending. MONPS not only actively sponsored the workshop, but also provided three of the speakers.
Autumn	BOD decided to send a questionnaire to all Society members soliciting input as to where the members wanted the organization to go. Over 150 questionnaires were eventually returned, with most respondents stating the most important function of MONPS should be the preservation of plants, wild places, and plant communities.
1984	
January	BOD adopted a resolution favoring state legislation that would, for the first time, protect native plants in Missouri. This bill was subsequently passed and signed by the governor.
January 10	Organizational meeting held at Missouri Botanical Garden for the creation of a St. Louis chapter of MONPS.
February 23	St. Louis chapter of MONPS officially founded with the election of local officers and the drafting of a letter to the state BOD requesting recognition as a local chapter of the Society.
Spring	BOD granted official recognition of St. Louis local chapter. BOD noted that southern Illinois local chapter of MONPS had become an independent organization no longer affiliated with MONPS, and had expanded state-wide in Illinois, becoming the Illinois Native Plant Society.
Spring	MONPS made second foray into political action when BOD agreed to support proposed amendment to Missouri Constitution to levy an additional one-tenth of one percent sales tax to be used for state parks and soil and water conservation purposes.
1985	
January	BOD directed MONPS president to appoint an ad hoc committee to develop an awards program.

June	Ad hoc awards committee recommended to BOD the establishment of four awards: (1) the Erna R. Eisendrath Memorial Education Award, (2) a research award (later renamed the Art Christ Memorial Research Award), (3) a plant stewardship award, and (4) the Julian A. Steyermark Award, the Society's highest award, presented to an individual who has made outstanding contributions to any or all aspects of Missouri botany.
August 7	Missouri voters approved the state constitutional amendment to levy an additional sales tax for state parks and soil and water conservation. John Karel, Director of Missouri Department of Natural Resources Division of Parks and Historic Preservation, wrote a letter to MONPS thanking its members for their support on this issue.
Autumn	Name of old Environmental Action Committee changed to Environmental Action and Education Committee to reflect change in duties and focus.
December	BOD decided that MONPS should have two publications. *Missouriensis* was reduced to just two issues a year, and a new bi-monthly newsletter was created to keep the membership of the Society more informed in a timely manner. BOD agreed to proposal to provide grant up to $250 to students or Society members for expense money toward a project which would add to the general knowledge about Missouri's flora.
1986	First issue of MONPS newly-created newsletter
January	distributed. One of the items in that newsletter was the announcement of a newsletter naming contest. Society's membership eventually selected Wally Weber's suggestion of *Petal Pusher* as the title for the newsletter.
March	MONPS editorial committee met to decide which types of information and articles would go into the Society's two different publications.
April	Three new local chapters announced: Columbia (Hawthorne), Jefferson City, Kansas City. A fourth, at Kirksville, followed later that year. MONPS President David Castaner appointed a committee to review the role of local chapters regarding MONPS dues structure and representation on the state BOD.
Summer	First issue of MONPS newsletter under title *Petal Pusher* published (Vol. 1, No. 4). Official announcement of MONPS grant program appeared in *Petal Pusher*.

June	First MONPS awards presented. The Julian Steyermark Award was presented to Art Christ. The Erna Eisendrath Memorial Education Award to Edgar Dennison. The Research Award to Bill Summers, and the Stewardship Award to Fred Hussman. Only one proposal for grant money was received, and $100 was awarded to Linda Ellis, Society member, for travel to search for rare plants in Stone and Taney Counties.
July	Old State Inventory Committee, recently renamed Missouri Flora Atlas Committee, met to discuss goals and future of that effort. Committee determined that immediate goal was to produce an Atlas of the Flora of Missouri, but the estimated time for completion was seriously underestimated.
November	By-laws Review Committee met and proposed that by-laws be amended to provide for each local chapter to have one voting representative on the state board. BOD, by mail vote, accepted this proposal in late 1986.
December	BOD agreed unanimously that MONPS join the Conservation Federation of Missouri as an affiliate organization.
1987	
January	Springfield local chapter of MONPS formed.
March	*Petal Pusher* carried announcement that the Missouri Department of Conservation had entered an agreement with Missouri Botanical Garden to update Steyermark's *Flora of Missouri.*
October	U.S. Forest Service and Bureau of Land Management gave tentative approval to allow mining in Mark Twain National Forest. MONPS BOD voted to oppose this mining proposal and directed the Society's Environmental and Education Committee Chairman to write a letter to that effect to the Mark Twain National Forest Supervisor, and encourage local MONPS members to write letters opposing that effort as well. Before the issue was resolved, the company withdrew its request to mine.
December	BOD re-examined whole issue of the Society's finances and dues structure. President Doug Ladd and Treasurer Mervin Wallace submitted a draft financial plan to place MONPS on a sustainable healthy footing. BOD decided to delete old categories of *Sponsoring* and *Sustaining* membership, but added a *Lifetime* category for a one-time payment of $200.
1989	MONPS again became involved in political arena.
March	Article in *Petal Pusher* encouraged membership to write letters in support of two bills pending in Missouri

	General Assembly. One would prohibit sale and distribution of purple loosestrife; other would make it illegal to pick or dig wild plants from public or private land without the landowner's permission. First bill became law, effective August 28, 1989; second bill never made it out of committee.
June 17	MONPS held a *Missouri Wildflower Day* at Coulter Science Center of Westminster College to celebrate the Society's tenth anniversary. Festivities included speakers and field trips; exhibits from such groups as the Center for Plant Conservation and The Nature Conservancy; and a concluding banquet where the award recipients for 1989 were announced.
Summer	MONPS made its first venture into merchandising by producing for sale a MONPS T-shirt with an illustration by Linda Ellis of royal catchfly (*Silene regia*), a plant on Missouri's watch list.
September	MONPS President Bill Summers suggested creation of a slide bank of Missouri plants for MONPS members to use for presentations.
December	On a divided vote, BOD agreed to support proposed Natural Stream Act for Missouri.
December	By-laws committee appointed to do a complete review of the existing MONPS by-laws, suggest needed changes, and bring the entirety into conformity.
1990	
June	Steve Timme volunteered to curate the MONPS slide bank.
December	BOD directed Jack Harris, as co-chairman of new Environment and Education Committee, to present policy recommendations to the Missouri Department of Conservation on the future of Forest 44, a recently acquired conservation area near St. Louis.
1991	
Early	After a long and contentious discussion, BOD decided not to take a stand on the upcoming appointment to Missouri's Conservation Commission, but to encourage the members to make their views know. BOD did adopt (after another extended and intense discussion) a *proposed profile* which they believed the candidate should match.
September	Wally Weber announced that a preliminary draft of the *Missouri Flora Atlas* was now ready to be printed. An index to volumes 1–10 of Missouriensis (compiled by Alice and Paul Redfearn) was published.
December	New local chapter formed in Mt. View area and took the name Ozark Showy chapter.
1992	
February 29	Special day-long meeting of BOD and interested members to take an in-depth look at the Society, its objectives, priorities, and short-term and long-range

	goals. Twenty-one people from throughout the state attended and agreed to several recommendations.
September	Joint meeting of MONPS and Kansas Wildflower Society entitled *Threshold of the Prairie Symposium*. Two-day event included speakers, field trips, book displays, and social gatherings, which gave members from both groups opportunities to share ideas, concerns, and a general interest in native plants.
December	BOD suggested changing the membership configuration of MONPS in three basic ways: (1) everyone who was a member of the state Society would become automatically a member of one of the local chapters, (2) membership category of *State Member Only* would be abolished, (3) dues would be uniform for all members instead of each local chapter setting its own dues on top of state dues. These proposals were sent to local chapters for members to discuss.
December	Research Committee proposed, and BOD agreed, to establish a file to collect floristic information about various sites in Missouri. The Missouri Botanical Garden agreed to house the files, which should insure the long-term accessibility and protection of the materials.
1993	MONPS was one of 13 local conservation,
February	environment, nursery, and landscape organizations involved in sponsoring a Naturescaping Symposium held at the Powder Valley Nature Center in St. Louis, with the Missouri Department of Conservation as host. There were over 230 attendees.
April	After taking proposed changes in membership structure to local chapters, BOD accepted first two changes (see above) without much debate, but there was considerable dissent about the acceptability of standardized fees for all chapters. After further local discussion, this change was adopted in June 1993, but objections to forcing a local chapter to collect dues was so vehement that the requirement was later dropped.
April	BOD authorized Jack Harris, co-chairman of the Environment and Education Committee, to write a letter to the appropriate Missouri legislators to support a bill that would make it a misdemeanor to dig or remove plants or plant parts form real property of the Missouri State Highway and Transportation Department without permission. Purpose of the bill was to stop the practice of the commercial digging of wildflowers from Missouri's roadsides. Combined with bill relating to noxious weeds, the legislation passed and was signed into law.

June 8	Missouri Governor signed law against digging or removing plants from Missouri roadsides. (see above)
September	BOD approved a brochure and badge for the MONPS Wildflower Badge Program which had been developed by the St. Louis chapter. Badge could not be purchased; it had to be earned by completing a certain number of exercises relating to native plants.
December	Revised MONPS by-laws adopted by BOD.
December	BOD approved publication of the *Missouri Flora Atlas* so that it would be ready for the Missouri Native Plant Week coming in June 1994. Unfortunately, the publication did not make that deadline.
December	After an extensive discussion about finances, BOD concluded that Society dues were meant to cover operational costs of the Society and publication expenses. Other programs or activities would have to be covered by other fund raisers.
1994	
January	*Petal Pusher* published a *Regional Sources of Native Plants* list.
April	Steve Timme reported that the MONPS slide bank held over 13,000 slides, with each one detailing the species presented, and its habitat, distribution, and flowering time.
June	Missouri Governor Mel Carnahan signed proclamation declaring that June 5-11, 1994, would be Missouri Native Plant Week in observation of the 15th anniversary of the founding of MONPS. A bandana with a design by Linda Ellis was produced to commemmorate the anniversary.
September	BOD created a Nursery Guidelines Policy Committee to examine the Society's relationship to nurseries, the public, and the mission of MONPS.
Autumn	MONPS asked to present testimony in favor of continuing the Missouri sales taxes for state parks and soils. BOD asked Jack Harris, co-chairman of the Environment and Education Committee, to do that on behalf of the Society.
December	Nursery Guidelines Policy Committee made its recommendations to the MONPS BOD. The committee proposed two goals: (1) follow the lead of other state native plant societies and send questionnaires to nurseries about their propagation policies and practices, and (2) publish guidelines for consumers citing what questions should be asked of nurseries. After long discussion, BOD concluded that MONPS should provide information and advisory literature to assist people in making wise selections and purchases of native plants, but that the Society should not

	presume to question or approve the activities of enterprises in their business practices.
1995 & 1996	MONPS became heavily involved in the Missouri initiative petition campaign to continue the sale tax funding for state parks and soil and water conservation.
1995	After years of ad hoc measures, BOD adopted *MONPS Fund Raising Guidelines* as the official policy of the Society governing fund-raising activities.New local chapter of MONPS, the Osage Plains Chapter, formed in the Clinton area.
April	
Spring	BOD established fifth MONPS award, this one to recognize a member's service to the Society itself.
Spring	BOD agreed to become a *Cooperating Member* of the newly created Federal Native Plant Conservation Committee, a network of federal agencies and other organizations interested in working to increase the appreciation of the value of native plants, and to facilitate the conservation of native plants and their habitats.
November 10	MONPS treasurer received an inquiry, via electronic mail, about membership information, the first incoming electronic mail to MONPS from outside the Society.
November	The e-mail addresses of all MONPS board members who had electronic mail capability published in *Petal Pusher* for first time.
December	BOD agreed to donate $350 (roughly the equivalent of $1 per member) to the Citizens Committee formed to help finance the campaign to renew the sales tax funding for state parks and soil and water conservation.
1996	*Petal Pusher* carried long article by Jack Harris, co-chairman MONPS Environment and Education Committee, on the initiative campaign for state parks. He explained the origin and necessity of the campaign and encouraged Society members to get involved in support.
January	
April	In an attempt to come to terms with the variety of issues that came before the Society each year, especially those that needed to be resolved between state board meetings, the BOD approved the following guidelines: (1) MONPS should be active on matters and issues relating to botany, (2) policy or position statements that could not be reviewed by the entire BOD at a regularly scheduled meeting should be agreed upon by at least two members of the board in addition to the MONPS member proposing the statement, and (3) issues and subject areas beyond

	those noted above should be brought to the attention of the board at a regularly scheduled meeting whenever possible.
April	BOD agreed to become a member of the national coalition pushing the *Teaming with Wildlife* proposal which would charge a modest tax for certain outdoor equipment, with the revenue generated going into a wildlife diversity fund that would be dispensed to the states by various kinds of matching grants.
May 31–June 2	MONPS held joint meeting with the Illinois Native Plant Society at Cape Girardeau, Missouri, with various activities on both sides of the Mississippi River.
May	Pamela Olsen earned the first MONPS *Wear the Coneflower* badge.
September	BOD decided to have a Home Page on the Internet.
September	Once petition campaign for state parks was successful in getting enough signatures to get the measure on the ballot, the issue now became convincing people to vote to continue the sales tax. BOD agreed to contribute $300 to the Parks and Soils Coalition to help pay for publicity in support of a "Yes" vote in November.
September	For years the Missouri Department of Conservation had maintained and distributed a *Regional Sources of Native Plants List*. In the mid-90's, that agency decided it could no longer continue to do so. A representative from that agency asked MONPS to assume the responsibility for that list. After an extensive discussion, the BOD agreed to this request. MONPS President Larry Morrison appointed a committee to investigate the issues and return to the board with suggestions as to what the Society's policy should be regarding this list and some of the problems associated with it.
November	Missouri voters, by almost a two to one margin, voted to continue the state sales tax funding for parks and soil and water conservation.
December	BOD decided that the *Regional Sources of Native Plants List* should be *self-selecting*, i.e., if a nursery claimed it carried native plants, then MONPS would accept that claim at face value.
December	BOD decided to create a two-part brochure on native plants. ITo educate the public about some of the broader issues involved, the first part of this brochure would provide information about the ethical practices regarding the propagation and sale of natives, a discussion of why natives were good choices, and other educational information. The second part would contain the actual list of nurseries and seed sources.

1997	First MONPS service award presented to Pat and Jack Harris for: "Their dedication and outstanding contributions to all aspects of the Missouri Native Plant Society."
April	Because of the difficulty in attracting publishable material, the BOD authorized the editors of *Missouriensis* to produce only one issue annually.
June	MONPS sources of native plants information turned into draft copies of a series of tri-fold brochures, each dealing with a specific topic. These drafts would be reviewed by the BOD then put into final form.
June	BOD authorized ordering of lapel pins with the Society's logo on them. These pins would be used for various promotional and incentive programs.
July	MONPS introduced series of *Fact Sheets* about native plants. Initially there were five such sheets: (1) basic information about native plants, (2) responsible buying, (3) herbaceous plant sources, (4) grass sources, (5) tree/shrub sources. Later in the year, three additional fact sheets became available: (6) native plant suppliers, (7) butterfly gardening using native plants, and (8) landscaping with native shrubs and small trees.
December	BOD decided, reluctantly, to dissolve officially the Ozark Showy and Kirksville local chapters of MONPS. In both areas there had been no local chapter activities for several years.
End of Year	MONPS financial base was strong enough that not all its funds were needed for day-to-day operations. Accordingly, the BOD directed the treasurer to invest $4,000 in a 12-month certificate of deposit.
1998	World Conservation Union asked if MONPS would be
Early	interested in becoming a representative on the North American Plant Specialist Group. BOD believed the request was both an honor and opportunity and readily accepted. MONPS President Larry Morrison appointed George Yatskievych as the Society's representative
April	Mike Currier, Research Steward for the Missouri Department of Natural Resources State Parks Division, approached the BOD and asked for MONPS to assist in plant survey and monitoring in Missouri's state parks. Specifically, he requested MONPS members' assistance in performing an updated inventory of state-listed plant species that might occur in Missouri's state parks.
April	MONPS home page transferred successfully to the University of Missouri's Web site.

Summer	Joint meeting with the Iowa Native Plant Society. Activities followed the now familiar pattern of field trips in both states and the opportunity for members of both societies to discuss mutual interests, concerns, programs, and future plans.
Autumn	Announcement made that *Teaming with Wildlife* initiative, which MONPS had endorsed in April 1996, never received enough backing in Congress to be enacted.
December	BOD changed MONPS fiscal year from January 1–December 31 to July 1–June 30 so that the Society's fiscal year would correspond to the Society's election cycle. To ease the transition to the new system, the BOD resolved that the new fiscal year would not take effect until July 1, 2000.
December	BOD agreed to offer at the International Botanical Congress meeting in St. Louis in 1999 a $250 prize, in the Society's name, for the best botanical artwork whose subject was native to the Midwestern United States.
December	MONPS agreed to join the Grasslands Coalition, a collection of groups interested in prairies and their conservation and restoration.
Winter	*Chinquapin*, the newsletter of the Southern Appalachian Botanical Society, featured an article on MONPS in its Winter 1998 issue (Vol. 6, No. 4).
1999	MONPS formalized what had been an undeclared
April	policy and decreed that *Petal Pusher* would not accept paid advertisements. MONPS added images of Missouri native plants to its Web page.
June	MONPS celebrated its 20th anniversary. At that time, the Society had 334 members, and was exchanging newsletters with 34 other organizations.
Summer	July–August *Missouri Botanical Garden Bulletin* (Vol. 87, No. 4) carried an article about the International Botanical Congress meeting in St. Louis, and specifically mentioned the monetary prize that MONPS was offering. MONPS added a non-monetary *Honorable Mention* award to its art prize. This award was won by Mary C. Bauschelt of Cambria, Wisconsin, for her watercolor of bloodroot (*Sanguinaria canadensis*). The winner of the MONPS art award, and the monetary prize that accompanied it, was Robin A. Jess of Edison, New Jersey, for her watercolor of pitcher plant (*Sarracenia purpurea*).
August	MONPS operated an exhibit booth during the XVI International Botanical Congress. The Missouri Botanical Garden was the operations center and the exhibition and meetings were held at the Americas

	Center in St. Louis, MO for the period 2–6 Augus. An estimated 5,000 professional botanists from around the globe attended this once-every-six-years Congress. Carl Darigo, Sue Hollis, and Jack Harris passed out literature, answered questions, and sold MONPS T-shirts to interested parties from Brazil, Australia, China, et al. MONPS was the only U.S. Native Plant Society to have a Native Plant promotional booth at the International Congress.
December	Modern technology provided the opportunity to streamline and expand the way the MONPS BOD handled time-sensitive issues during the intervals between the quarterly meetings. The BOD decided that henceforth the MONPS President should query board members via electronic mail and the decision of the board would be determined based on the responses received.
2000	BOD adopted policy that the MONPS Website would not display for-profit commercial information or links to for-profit sites.
January	
December	BOD voted unanimously to enroll MONPS as a *Friend* of the Center for Plant Conservation, a national organization whose mission is: "To conserve and restore the rare native plants of the United States."
December	BOD decided to name MONPS Service Award in honor of John E. Wiley.
2001–2009	Nels Holmberg, representing MONPS, enters agreement to collaborate in a program organized by the Audubon Society and Meramec Community College. MONPS will conduct native plant workshops annually as a part of the Master Naturalist Certificate Program offered by the College. Various members of the MONPS act as instructors. 24 workshops have been offered to date.
2001	Membership page, with renewal form, added to Society's Web page.
April	
April	Board member Paul McKenzie conducted a grass identification workshop for anyone interested as part of the quarterly board meeting.
June	MONPS Fact Sheets added to MONPS Web page as PDF files which could be downloaded or printed.
September	Missouri Department of Conservation approached MONPS about applying for a grant through the Partnership for Wildlife program of the U.S. Fish and Wildlife Service. Such grants required a partnership between a state agency and a private organization working together. MONPS BOD agreed it was interested in pursuing the application.

September	After a long and convoluted development of nearly 20 years, the *Atlas of Missouri Vascular Plants* was finally completed and ready for sale. The *Atlas* information was also made available for free over the World Wide Web.
September	Missouri Department of Natural Resources, State Parks Division, invited MONPS representative to attend a meeting to discuss wild area policy. BOD agreed to participate and send a representative.
September	Grass Identification Workshop—Identifying Missouri Grasses was conducted to a full enrollment at Meramec Community College, 20–21 September. Instructor Dr. Paul McKenzie.
September	BOD decided that as of December 2001 MONPS would create and maintain a policy manual where any decisions and policies implemented by the BOD would be kept.
December 1	BOD voted to offer outside speakers at the Friday night gatherings of the quarterly board meetings an honorarium of $75.00.
December	BOD agreed that board decisions might be processed via electronic mail balloting in those situations where calendar time restrictions precluded delaying until the next regularly scheduled meeting. Ballot would present the options of yea, nay, abstain, and inappropriate to MONPS to consider.
2002	
March	H. Stanton Hudson, a Missouri native, naturalist, and long-time member of MONPS died at the age of 82. His wish was to establish a scholarship fund, through MONPS, to benefit students working on projects involving Missouri flora.
April	BOD agreed, in principle, that MONPS would consider adopting a policy to manage a long-term memorial account. An exploratory committee was appointed to advise the board on available options and make recommendations.
June	*Carex* Workshop 2002, University of Missouri–Columbia. ID of Missouri Sedges was conducted to a full enrollment 3–4 June. Instructors: Dr. Paul M. McKenzie, Michael Currier, Paul Nelson, Brad Jacobs. Organized by Dan Drees.
June	MONPS donated several items for a silent auction at the North American Prairie Conference. Proceeds went to the Missouri Prairie Foundation.
December	BOD agreed to draft operating guide for the Hudson Fund, as proposed by the Hudson Fund Ad Hoc Committee.

December	BOD agreed to join 25 other native plant conservation organizations and become an affiliate member of the Native Plant Conservation Coalition.
2003	
March	Missouri Department of Natural Resources, State Parks Division, requested assistance from MONPS members in identifying the extent and distribution of exotic plants in Missouri's state parks.
June	The Second Annual Missouri *Carex* Workshop was conducted to a full enrollment at Southeast Missouri State University, Cape Girardeau, MO 4–5 June 2003. Instructors: Dr. Paul McKenzie, Dr. George Yatskievych, Paul Nelson, Michael Currier, Brad Jacobs. Organized by Dan Drees.
December	BOD voted to offer a complementary life membership in MONPS to everyone who had served, or would serve, as President of MONPS in appreciation of those persons' time, talents, and often money in service to the Society.
2004	
April	BOD decided to have a link on MONPS Web page to the Center for Plant Conservation's Web site for that organization's *Plant Conservation for Gardeners* tip sheet.
April	BOD voted to disband Environment and Education Committee and to handle issues on a case-by-case basis.
2005	
January	First announcement soliciting applications for Hudson Fund grant money sent out.
May	Second joint meeting of MONPS and Illinois Native Plant Society at Pere Marquette State Park, Illinois, with activities on both sides of the Mississippi River.
July	MONPS announced that Ms Alexandra Harmon-Threatt and Ms Tara Herring were awarded the first Hudson Fund grants of $500 each.
2006	
April	Revised MONPS Fact Sheets renumbered (#1–4) and loaded on MONPS Web page.
June	BOD voted to donate $400 to Ozarks Underground Laboratory to aid in purchase of native seed for conversion of old pasture to native prairie vegetation.
July	MONPS Publicity Chairman Kevin Bley, on behalf of MONPS, honored Alberici Construction Company with a *Certificate of Recognition* he created, the Blazing Star Award, for recognizing and publicizing specific actions of individuals or groups which benefited native plants. Alberici used native plants on the grounds of the company's headquarters.

2007	U.S. Fish and Wildlife Service approached MONPS
April	about a partnership to create plant lists for national wildlife refugees located in Missouri. Squaw Creek NWR expressed a special interest in such a project.
May	MONPS pledged $500 to the Dan Tenaglia Foundation for the Preservation of Natural Areas. Dan was an avid nature photographer who was killed in February 2007 when hit by an automobile while he was riding his bicycle. MONPS had awarded Dan the Erna R. Eisendrath Memorial Education Award in 2004 in recognition of his achievements in establishing a Web site showcasing Missouri native plants.
June	Nomination form and award certificate for Blazing Star Certificate of Recognition completed and placed on MONPS Web site. This award was intended as a *loose* award that local chapters could use as they saw fit. They did not need the state organization's approval to grant the award, but did need to notify the state BOD when a certificate was presented.
June	MONPS Fact Sheet #5 on invasive plants completed and placed on Web site.
June	BOD decided not to offer a MONPS ball cap as a money making project but to make it available for members who wanted one.
September	BOD directed MONPS President Rex Hill to send letter to AmerenUE endorsing least intrusive option for new power lines through the LaBarque Creek watershed.
December	BOD recognized new local MONPS chapter, *Perennis* from the Bootheel region.
2008	Joint meeting with the Arkansas Native Plant Society
April	in Harrison, Arkansas.
July	Redesigned MONPS Web site introduced, with David Winn of the Kansas City local chapter assuming the role of Webmaster. He expanded the scope of the site to allow much more interaction from the membership.
September	Plant list for Squaw Creek NWR completed and sent to the Refuge. Mingo NWR list in process. Big Muddy NWR requested help in preparing a similar list.
2009	Joint meeting with the Arkansas Native Plant Society
May	in Springfield, Missouri. This meeting reciprocated the joint meeting held in Arkansas in 2008. Focus was on prairies in general and Mead's milkweed in particular.
September	MONPS celebrated its 30th anniversary in Fulton. In addition to a field trip to nearby Prairie Garden Trust, there were talks about changes in Missouri flora over the past thirty years and presentations on the future of MONPS and the roles it could perform. Seven former presidents attended the Saturday evening banquet.

Group photo of attendees at the MONPS organizational meeting, 2 June 1979. Legend: **1.** Gordon Maupin; **2**. Jon Hawker; **3.** Dr. Leo Gallaway; **4.** Lou Bottenberg; **5.** ?; **6.** ?; **7**. Tom Toney; **8.** Sue Hollis; **9.** Becky Haefner; **10.** Bev Roedner; **11.** Walter Lewis; **12.** Ramon Gass; **13.** ?; **14.** Barbara Bassett; **15.** Alice Nightingale; **16.** Leroy Korschgen; **17.** Rick Daley; **18.** ?; **19.** Jim H. Wilson; **20.** ?; **21.** Edgar Denison; **22.** Rich Thom; **23**. Paul Redfearn; **24.** Norlan Henderson; **25**. David Dunn; **26.** Ralph Lucas; **27.** Betty Nellums; **28.** ?; **29.** Robert Mohlenbrock; **30.** Marshall Crosby; **31.** ?; **32.** Warren Wagner; **33.** Greg Iffrig; **34.** Jerry Kliburn; **35**. Paul Nelson; **36.** Wally Weber; **37.** David Foster; **38.** John Gardner; **39.** Keith Evans; **40.** Art Christ; **41.** John Wylie.

June 2009: Steve Buback presents the MONPS Plant Stewardship Award to Greg Galbraith, of the Ozark Regional Land Trust.

Seven former MONPS presidents at the 30th Anniversary banquet. Left to right: Doug Ladd, Paul Redfearn, Bill Summers, Karen Haller, Jack Harris, Larry Morrison, Rex Hill.